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in focus

COMPUTING'S POLITICAL PARADOX. Departmental computing offers the promise of greater connectivity but also creates a tug-of-war between MIS and end users over control and computing resources. Differences in the definitions of this new force only add to the growing confusion. If MIS doesn't take the initiative and work out a solution with the various departments involved, potential rewards could get lost in the furor. By Stan Kolodziei, Page 18.

VENDORS FIGHT FOR OFFICE TURF. As MIS and users wrangle over the future of departmental computing, mid-range vendors have their own battle to wage. Here's what some of the top vendors are providing to beat their opponents and what their future plans include to remain competitive. By Sandy Austin. Page 21.

USERS REAP TECHNOLOGY'S BENEFITS. Developments in software are providing greater capabilities to departmental end users. Some of the technology that will enable users to write their own applications and work more independently of MIS is here today, and more is coming soon. By Patricia B. Seybold and Judith S. Hurwitz. Page 43.

Confessions of users

By Rebecca Hurst. Organizations are building a variety of configurations that fall under the departmental computing umbrella. Read why they have implemented what they have, what they've learned and how happy they are with the results. Page 25.

The perfect fit

By Michael Durr. How do you decide between PC LANs and sharedprocessing minis? Here's some practical advice to consider when planning a departmental system. Page 37.

4GLs find a home

By Stan Kolodziej. 4GLs may finally be overcoming MIS obstacles to become workable tools for departmental systems. Discover the story behind their success, Page 47.

Minis reign over PC LANs

By Rebecca Hurst. Minicomputers still offer the most capabilities and connectability for departments but other technologies are catching up. Page 55.

Conflicts of interest

By Tom Galvin. After systems have been bought, MIS is left to integrate them. Selecting the right overall operating system and then establishing it as a standard may be difficult but critical. Page 59.

SPECIAL SECTION



IBM's 9370

Will IBM's 9370 computer shape the future of departmental computing or will it be the other way around? Features Editor Michael Tucker analyzes the impact of this machine on the marketplace and how it places power and control squarely in the hands of MIS. Section begins on page 29.

From the Editor

Including your letters to us. Page 5.

Q and A

Rebecca Hurst speaks with William Slavin of Peat Marwick. Page 6.

Manager's Corner

Jim Young explains the role of a chief design architect. Page 12.

News & Analysis

IBM's SAA strategy, CD-ROMs, neural networks plus dB. Page 13.

Blue Beat

Diedre Depke analyzes the IBM vs. DEC departmental war. Page 61.

Products

The PS/2, new VAX 8000s, product checklist and a lot more. Page 61.

Calendar

Events in the computer industry. Page 67.

The Insider

Thomas Roberts extols the virtues of PC LANs and minis. Page 68.

Log Off

Find out about the projections for the U.S. departmental systems market. Page 68. Jita.

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Write Us

We welcome letters to the editor and publish those we judge to be of interest to our readers. Letters should be addressed to the Editor, Computerworld Focus, 375 Contituate Rd., Box 9171 Framingham, MA 01701-9171.

FROM THE EDITOR

Change for the better

ere it is — the new design of Computerworld Focus! This month's issue brings you a number of design changes that we think make Focus livelier and easier to read. Through discussions with readers and an analysis of our design and editorial

content, we have fine-tuned our magazine to improve the information we provide our readers. We have revamped our Products section, which starts on page 61, to provide a more complete analysis of developing technologies as well as a close-up of new products. We have introduced a section called Log Off on the final page of every issue that provides a snapshot of the month's technology trends. We hope our changes make *Focus* more stimulating, appealing to read and informational. Please let us know what you think.

CHANGE IS OCCURRING everywhere, not just in *Focus*. This month's issue takes a look at departmental computing and how it is transforming the role of MIS. Departmental computing is predicted to grow at an annual rate of 43% through 1991, according to a study by research firm Input. This means faster growth at the mid-range than for either mainframe or micros.

Forward-thinking MIS managers should be at the cutting edge of this evolution. Instead of waging a tug-of-war with department heads and end users over who controls what, MIS can leverage technical and organizational innovations to their advantage. By taking the initiative, MIS can win points with users and at the same time give up functions that it wanted to get rid of anyway. By freeing itself from time-consuming, department-specific problems, MIS can take account of the bigger corporate picture.

That's easier said than done, of course, but this issue helps you reach that goal. We describe how departmental computing is being defined and applied in other organizations. We also show you how to assess your firm's technology needs as well as how to win in organizational politics. By acting as the business strategist whose job it is to run a global computing plan, MIS could end up with the best of both worlds — less of the detailed work and more of the glory.

An Dooley

Seaworthy advice for connectivity's future

I enjoyed the special section on Connectivity written by Michael Tucker [CW Focus, April 1] and especially enjoyed his last few paragraphs using the analogy of the the sea. I have some thoughts that might prove a valuable extension of the author's analogy.

One of the great developments in cartography was the pooling of charts from the voyages of different sailors and sea captains. Each experienced mariner usually carried a portolano, an Italian phrase meaning portable coastal chart, which de-

tailed known harbor areas. The captains and crews constantly modified their charts as they traveled. One such grand atlas of these coastal charts was the Catalan Atlas of 1375.

It can be said that business and government computer users are in the process of putting together a Catalan Atlas of the computer world. There is a vast, unknown land of computers, mi-

unknown land of computers, micros, communications and applications to explore. But the first step in this exploration must be our willingness to admit our ignorance — to recognize this area as an unknown land of possibilities as well as dangers.

TO

THE

The computer world map is constantly changing through technologies, programs and innovations. We must pay close attention to the various "harbor guides" that different users have mapped out; their concerns, problems and successes are of prime importance in assessing the value of computers.

Connectivity is indeed the name of the game, but we must always be able to connect with one another first. In these times of rapid change, pragmatic human communication and a willing confession of ignorance when appropriate are perhaps the only life buoys we have to keep the entire ship afloat.

Michael Corriveau Milwaukee County Executive Office Milwaukee

Students garner invaluable experience with internship

We are responding to the letter from Kevin Kilpatrick in the Jan. 7 issue of Computerworld Focus regarding a real-world education. We are currently seniors attending Indiana University of Pennsylvania (IUP). However, instead of taking classes this semester, we have each opted for a 23-week internship. Currently in the tenth week of our internships at Allegheny Power Services in Greensburg, Pa., we are confident of our abilities because of our university education.

At the university, the computer science program is an applications program as opposed to a technical one. It is mandatory that students take two courses in Cobol in which, in addition to language syntax, they learn structured programming concepts and file handling techniques.

One of the most valuable courses offered at our school is modern programming languages. In this course, students become acquainted with languages such as C, PL/I and LISP. Other key courses cover IBM JCL, data communications, security and fraud.

The internship offers the opportunity to acquire job experience as well as develop professional poise. We highly recommend an internship program to broaden computer science and associated curricula.

Carol Butler and Cheryl Smith Allegheny Power Service Corp. Greensburg, Pa.

VIEWPOINT

Q AND A

William Slavin

Partner
Peat, Marwick, Main & Co.

illiam Slavin is a partner in the San Francisco Management Consulting Group of Peat, Marwick, Main & Co. accounting firm. A certified management consultant and systems professional, Slavin has spent 17 years "helping man



agement control the computer," he explains. Seven of those years were as president of Slavin Associates, which was purchased by Peat Marwick earlier this year.

Slavin recently spoke with Computerworld Focus senior writer Rebecca Hurst about the expanding role of departmental computing, management guidelines and techniques for controlling the technology.

What is departmental computing's impact on the office?

Knowledge workers are becoming more self-sufficient. These professionals are initiating their work and using administration people to finish rather than start projects. They no longer necessarily rely on the data processing department either. You might say the toothpaste is out of the tube. Users realize what they can do, and there's no way MIS will ever get them to packet.

Another aspect is applications. Tradi-

tionally, we talk about applications such as accounts payable, but departmental computing cuts across all that. Word processing and spreadsheets can be used anywhere; they're not dedicated. Also, advanced phone capabilities and electronic mail are changing the office structure. Eventually there won't be people taking messages.

Finally, computing is not the same as it was in the old days when managers showed a clear return on investment. With departmental computing, the differences are a lot harder to quantify.

What is the status of the office to day?

The office is the last frontier in applications computing. Someone from 100 years ago would be comfortable in an office today. That probably shouldn't be the case. We have to rethink the office.

Office work is ad hoc work. It's not as routinized as we think. [Only] a very small portion of time is spent on automatable tasks. A number of studies have found that knowledge workers spend most of their time on such things as meetings, conferences with co-workers and phone calls. Even typists spend only a small percent of their time typing.

All of the vendors' and managers' activities have been concentrated on automating that small portion. Even if you automate this area 100%, though, it's still only a small part of the work that takes place in the office.

What is the manager's challenge in bringing departmental computing to the office?

It's a major management challenge to implement departmental computing in a controlled fashion without stifling innovation

The architecture [encompassing both hardware and software] has to be consistent for the company to benefit. In designing an architecture, the systems manager has to understand how the machines, data and applications all fit together. Managers can let users implement systems locally, but these users have to conform to the corporate blueprint so each group's systems fit together in the end. The flip side is that the systems manager can't afford to fit users into a stratijacket.

There has to be room for innovation. This is not a situation in which rigorous cost-benefit decisions are going on. This is a way to refine departmental systems and bring them into the total picture.

A mistake among systems managers is that they tend to be too reactive. Too often the user shows up with a personal computer to tie into the corporate system, and the systems manager is not ready. Now the manager has to scramble to find a solution and placate angry users.

If you're trying to manage information as a resource, it will ultimately be linked somehow. Corporate users first want PCs to serve some local need. A year later, though, they want to tap into the corporate data base.

The challenge to the systems manager is to anticipate this requirement and be ready to incorporate it. You can't afford a laissez-faire attitude.

What guidelines can you offer for managing departmental computing?

here are some issues systems managers Continued on page 10

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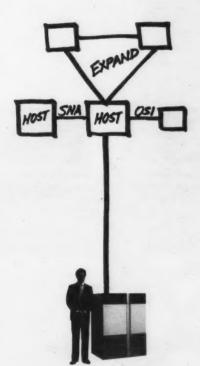
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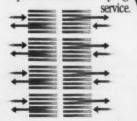
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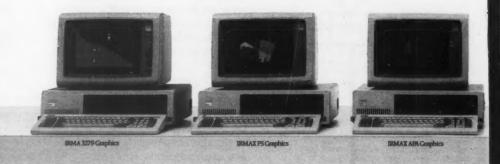
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VIEWPOINT

Q&A
Continued from page 6

need to consider. First, managers need to provide users with standards for machines, software, protocols and so on, so they can implement systems in a consistent way.

Second, managers need to

adopt a management approach that recognizes that, for departmental or decentralized computing applications, the organization can't afford rigorous cost analysis. It can take as long to develop a cost benefit analysis as it does to install the system.

Instead, managers need to allow what Tom Peters, author of the book In Search of Excel-

lence, calls "leaky" systems.

In a leaky control system, there are rules, but managers don't always have to enforce them rigorously. At the same time, systems managers have to know when to be strict and when to be forgiving. If managers enforce rules too rigorously, they'll stifle innovation. If they let users go too far, managers may find

themselves in trouble.

Third, systems managers have to know what users are doing with their systems. They have to be aware of local developments that turn into more serious business projects that need to be regulated.

Finally, managers have to tie everything together and have the system working all of the time. If users cannot tie in their computers, they will blame the systems manager.

What areas is the manager responsible for controlling in departmental computing?

IBM uses a concept developed by Robert Anthony of the Harvard University business school. In it, there are three levels of control: operational, management and strategic.

At the operational level are transaction applications such as accounts payable, accounts receivable and payroll. Transactions are the first applications to be implemented because they are easy.

The management control level is more difficult because you're tying business applications together. Instead of accounts payable/receivable, you have financial management. Pulling transactions together is a major effort, but most have done it pretty well.

Issues of senior management reside at the third level, strategic control. These [issues] are harder to get a hold on, and executives are traditionally more reluctant to have their tasks automated.

How do managers actually implement departmental control measures?

It's easier to say how not to control the technology than how to control it. It won't work to be a bureaucrat who mandates regulations. People will ignore them and do whatever they want.

One of the most successful ways a manager can control the technology is by providing new services that put the proper control in place.

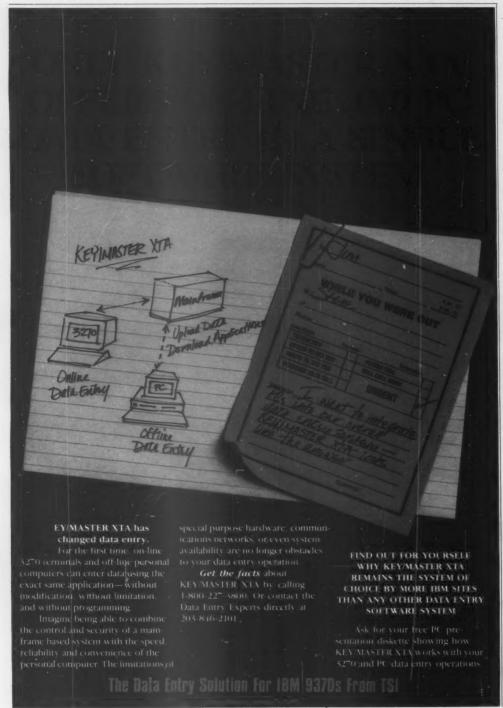
trols in place. For example, a trouble area for users is data bases. Data base management systems have so much power that they're dangerous in the hands of the amateur designer. A user starts building a simple data base, and it evolves quickly into one that requires a qualified data base person from the systems staff.

Managers can control this information by designating qualified data base people who will help users once they get past the comfort zone.

This kind of service brings users back to systems management. In this way you are implementing management controls, but you're providing a service in the process.

What factors do you think will affect the further growth of departmental computing in the office?

I see a big political problem in that many systems managers are not ready for it. They are the agents of change but are the most conservative members of the organization. They're being dragged along by users.



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VIEWPOINT

MANAGER'S CORNER

CDAs come of age

Jim Young

dding a chief information officer (CIO) to an organization's staff is a popular notion. Increasingly, firms are recognizing the importance of information as a corporate asset and moving to establish the CIO po-



sition. As valuable as this function is, however, many companies could benefit from a slightly different solution. Often, a chief design architect (CDA) more effectively meets the organization's long-term needs. In many ways the functions of the CIO

and CDA are similar. Each focuses on information systems at a high level, and each provides long-range and strategic leadership in the use of data processing as a resource.

The CDA, however, more expressly guides the way in which applications function and evolve. The CDA builds guidelines, both for environmental and functional systems, which can then be developed in a top-down manner. A great deal of attention is devoted to key systems and to the integration of applications and technologies. This means the CDA is the one likely to develop a strategy for centralized or distributed processing.

While the CIO is responsible for the meaning and value of information, the

CDA focuses on the functional uses of information. The CIO directs where and how information should be used, while the CDA monitors the flow of information. Whereas the CIO emphasizes the completeness of information and focuses on data management, the CDA works on delivering that information.

It is not exaggerated to suggest that the CIO is interested in information for analysis and decision making, while the CDA views information for its operational value. This difference may seem to make the CDA position less than contemporary. However, the CDA, in visualizing the entire operational process, has direct influence far beyond the boundaries of the electronic system. The CDA addresses job contents, business procedures and operational activities — all systems with a far-reaching effect on a firm's operation.

Who needs a CDA?

Certainly neither position is intrinsically superior. Choosing one over the other depends a great deal on factors such as the firm's needs and available skills.

Organizations in which the functional uses of systems — not just the value of affected data — are the critical factors are better served by a CDA's perspective. The CDA can ensure structural integrity as well as strategic consistency in firms undergoing operational environment changes. A CDA is also beneficial to firms with high data volume and many data alterations. In such cases, the CDA focuses carefully on the ways in which data is moved and changed.

For any company, it is important to evaluate the benefit of adding a CDA to the staff. Keep in mind that this position does not replace the application development department or overlap with its duties any more than the CIO duplicates the duties of the data base administrator. The CDA is an architect, not a builder. Except for strategically important applications, each system is reduced to a box drawn on a diagram that defines where and how it interfaces with other systems.

The applications development group works closely with the CDA to understand the strategic dimensions of systems before proceeding with typical user-oriented systems development methods. Meanwhile, the CDA spends far more energy working with the MIS director and the strategic planning function of the company. CDAs work closely with industry trade groups and vendors of future applications and technology. Indeed, CDAs, like ClOs before them, will perform tasks that were previously unheard of — this is why they are so important.

With the increasingly significant role technology plays in organizations, it is clear that more senior-level attention should be directed to information systems. In certain organizations, such as insurance companies, the clear value of the information itself calls for a CIO to provide the necessary leadership.

However, in many manufacturing environments, the way in which information is handled, the multitude of sequential operational uses and the potential interfaces to new technologies suggest a different approach. Such organizations should not be distracted by the popularity of a CIO, but rather, should institute the newer, more appropriate solution of a CDA.

Young is managing director of MIS for the Wheeler Group, a division of Pitney Bowes in Hartford, Conn.

Small change for the better



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news & analysis

UPDATE

IBM's PC barrage

IBM has been busy, most recently with an April personal computer product barrage that could change the course of departmental computing.

IBM provided some surprises, some yawns. Many analysts had predicted Big Blue would try and close out persistent clone makers by building a very closed architecture around its Intel Corp. 80386-based machines. It didn't happen.

"It's tight enough, however, to make it requisite that clone makers have enough research and development capital to keep playing the clone game," explains Michael Killen, president of Killen & Associates, Inc., a Palo Alto, Calif., research firm.

IBM also surprised many with the lack of aggressive pricing on its Personal System/2 line, especially at the low end, namely, its Intel 8086-based

'IBM sent out a message that it is not going to give in to pressure from clone makers and others to squeeze margins," explains Paul Evans, a vicepresident at the San Francisco office of consultants S. G. Warburg & Co. "What I think IBM is doing now is segmenting the dealer channels. Only those service-oriented retailers that can provide complete services are going to win IBM's blessing,' he explains.

With three Intel 80286based models introduced, IBM also reestablished its message that the Personal Computer AT line was alive and well and not about to be eclipsed by the glamor of the new 80386 machines.

IBM's 80286- and 80386based models will eventually run IBM's new multitasking Operating System/2, developed with Microsoft Corp., but will not be available until almost a year from now. In the meantime, however, there is PC-DOS 3.3, which IBM says provides some performance improvements and functional enhancements to current PC-DOS and Microsoft MS-DOS versions.

9370s will arrive sooner than expected

IBM has moved up the delivery date of its 9370 departmental

computers by two months, ostensibly, according to IBM, in response to heavy demand from customers to get the systems in their hot little user hands.

IBM says fixed configuration versions (that the company says will help expedite shipments) of the 9370 Model 20 and Model 60 will be shipped to customers in July instead of October.

Somewhere at the heart of this move, however, has to be IBM's concern about Digital Equipment Corp. and its continuing success in the departmental computing arena. The 9370 is IBM's bullet aimed at DEC, and IBM has decided that the trigger should be pulled a little earlier than planned.

Software AG's Natural scheme of things

In the fourth-generation language war, a front that has been quiet lately, Software AG of North America, Inc. has created a ripple with Natural 2, the new version of the company's Natural fourth-generation language programming system.

For one thing, Natural 2 offers windowing for mainframe applications development. It also offers automatic array processing. The combination of both, the vendor claims, will help produce major performance gains over other fourth-generation languages

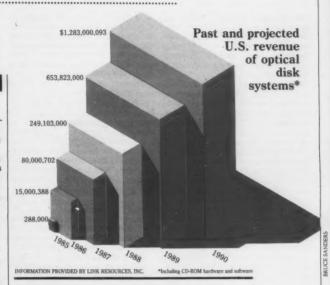
Software AG adds that Natural 2 will interface with IBM's DB2 relational data base sys tem by the end of 1987.

Departmental IDMS/SQL expected from Cullinet

Cullinet Software, Inc. is back in there fighting. The Westwood, Mass., software dereloper says it has a Digital Equipment Corp. VAX-based expert system waiting in the wings and has alerted loval customers that it plans to offer an IBM SQL-based data base management system for departmental as well as mainframe and personal computers.

The departmental version of Cullinet's IDMS/SQL will run under IBM's VM operating sys tem on the 9370. Cullinet added that a microcomputer version

Continued on page 17



IBM responds to DEC with its SAA strategy

It finally seems clear that IBM means business about tying its various systems architectures

The company has outlined a major push toward software integration called Systems Application Architecture (SAA), an ambitious strategy aimed at providing users with communications and software uniformity across its personal computer, mid-range and mainframe computer lines.

Under SAA, IBM claims, users and software developers will be able to write applications that will be compatible with existing and future models in the above product famili

The four key areas in which SAA commonality applies are communications interfaces, support, user interfaces and applications. If the announcement revolutionary coming seems from IBM, the time involved is definitely evolutionary. IBM says components of SAA will be gradually phased into the market with the complete system components probably not appearing until 1990.

Though IBM denies it, the SAA announcement no doubt is IBM's response to both Digital Equipment Corp.'s advertising jibes directed at IBM's historic troubles in tying its disparate computer lines together and the growing impatience of customers with IBM's inability to give them a clear systems interconnect path. Also goading IBM is the success DEC is enjoying in departmental computing, a success in large part due to the uniformity of its system architec-

According to Tom Friedman, manager of information systems consulting at Coopers & Ly-brand in Houston, "IBM is trying to retrofit everything, For more coverage of

SAA and the IBM

Personal System/2,

and that's difficult, especially in the large systems mainframe area. I certainly think SAA is achievable,

see page 14. mostly in the small systems and mid-range area. One way to make [SAA] happen is for IBM to drop its [System/36 and 38] series and replace them with 9370s."

Friedman says he is not sure, however, whether IBM's announcement is more smoke than fire. "You can bet IBM hopes its announcement will help it buy some time. Its strategy might be to convince a good portion of the customer base to hold off purchasing new equipment from DEC. Hewlett-Packard Co. and others with more uniform architectures.

"I don't think DEC is necessarily taking business away from IBM," Friedman says. "There are more people integrating

Continued on page 17

NEWS & ANALYSIS

OS/2: More applications power on the desks of users

IBM released a torrent of product announcements in April. At the heart were two products that represented new generations in computing — the Operating System/2 and the Personal System/2 computer series. They also represent a time of transition for users.

OS/2, developed jointly by Microsoft Corp. and IBM, breaks the single-task, 640K-byte memory barrier. Microsoft will make a general release of the system available to its non-IBM Personal Computer users in early 1988. However, in the hands of IBM, analysts agree, OS/2 will emerge as a key component of the Systems Application Architecture (SAA), IBM's system of protocols and standards for providing an integrated business systems solution. OS/2 holds promise of tying PCs to IBM's System/36 and 38 systems and 370 series computers.

At the individual level, says Mike Cohn, senior consultant at Input in Mountain View, Calif., OS/2 brings more applications power to the micro users desk. "Today with the [Intel Corp.] 80386, users have the power of an IBM 370/158 mainframe on their desks," he says, "but until OS/2, we haven't had a Microsoft MS-DOS operating system to support it."

OS/2 solves limitations

One effect of a new-generation, MS-DOStype operating system is that users and developers may not turn to Xenix, Microsoft's implementation of Unix, for higher level applications, Cohn speculates. "A number of applications vendors that would have preferred to stay with MS-DOS went to Xenix because they needed more memory and multitasking," he says. "OS/2 solves those limitations."

Despite the advantages of OS/2, it will take some years before it becomes the right operating system for all of the users

all of the time. "Users are not going to move to OS/2 unless they need an OS/2-based application, larger memory or more disk space." Some users may have applications that are satisfied by MS-DOS, Cohn says. Others may have a combination of OS/2 and MS-DOS packages.

Further, some users have written large amounts of custom software with MS-DOS, says Bill Kirwin, program director of personal computing policies and strategies service at the Stamford, Connbased Gartner Group, Inc. "It represents a significant migration," he says. The good news, Kirwin says, is that users will have time to make that migration an orderly one. "We'll be living with DOS for another two years, and during that time, we'll get more glimpses of OS/2."

PC-DOS 3.3 provided

Realizing the continuing need for MS-DOS, IBM will provide PC-DOS 3.3 in compatibility mode for users who need to migrate their current software to OS/2.

On the hardware side, the PS/2 micro line holds both performance benefits and concerns for users. One concern is the use of 3¼-in. floppy disk drives. Most of the popular MS-DOS packages reside on 5¼in. floppies, and users want to retain their investment. In response, IBM has announced that it will offer an external 5¼in. external drive option.

Another concern is the redesign of boards and slots within the PS/2 computers. IBM has added a lot of functionality to the motherboard so that users will not require add-on boards.

For example, Kirwin says, IBM has adapted a new graphics standard, Video Graphics Array, and has included it on the motherboard. As a result, he explains, "users no longer need all the IBM Enhanced Graphics Adapter, Color Graphics

dB

By Rich Tennant









Adapter and monochrome cards for the PS/2 machines."

IBM has also put much of the computers' memory on the motherboard, Kirwin says. Power users who want 16M bytes on their desks will still add boards, he notes. However, most mainstream users who need 1M to 2M bytes will find them already in their systems.

Because more computing power resides on the motherboard, IBM has left fewer slots in the PS/2 systems. The result is a smaller footprint, and Kirwin applauds IBM's approach.

However, the remaining slots pose a problem for users and board vendors alike, Kirwin says. Corporate users who have stocked spare boards will find they cannot use them with the new machines, he says. Similarly, board manufacturers will have to redesign their products to fit the PS/2 systems. However, this problem is not new. "We had the same problem with board incompatibilities between the IBM PC XT 286 and PC AT," Kirwin explains. "Board manufacturers will have PS/2-compatible boards available in a short amount of time." — RH

Inexpensive CD-ROM systems could push more corporate data onto optical disks

Optical disk technology will have an enormous impact on corporate and departmental computing in the years to come.

One of the most significant current developments in compact disk/read-only memory (CD-ROM) systems, for example, is the appearance of inexpensive optical disk systems, costing little more than \$1,000, which will be marketed both directly by manufacturers and by retail chains such as Sears Business Systems Centers. These low-cost CD-ROMs use the same optical disk technology now driving the music industry.

now driving the music industry. Such systems are initially aimed at using programs like Microsoft Corp.'s Bookshelf, which contains thesaurus and dictionary data, and Lotus Development Corp.'s One Source, a financial data base.

Microsoft includes a program necessary for a personal computer equipped with a CD-ROM drive to search the optical disk, and Lotus provides the ability to load information from a One Source disk into a 1-2-3 spread-sheet on a PC.

These relatively inexpensive optical disk systems can store 550M bytes of data, equal to 1,500 floppy disks or a 250,000 pages of typewritten text.

"In 1987, the fastest growth

"In 1987, the tastest growth areas for CD-ROM will be in placing corporate data such as system documentation, maintenance manuals and parts catalogs on disks," explains Steven Sieck, vice-president of Electronic Services at Link Resources Corp. in New York. "It think more general office archival applications might be slow in taking off. There are psychologi-

cal problems comapnies have to overcome in putting so much information on one disk," he says.

However, Les Cowan, editor of the "Optical Memory News" newsletter put out by Rothchild Consultants in San Francisco, sees great potential for low-cost CD-ROM systems in storing localized data in large corporate departments. "These systems can be plugged into departmental computers and the data transferred directly onto the optical disks," Cowan explains.

One drawback

There is one drawback, however. The problem lies in the writeonce, read-many aspect of the technology, which enables data to be written onto the disk once with no changes.

"This kind of archiving requires employee discipline," ex-

plains Bill Loveridge, director of corporate systems at Farmington, Conn.-based Otis Elevator Co. Three months ago, Loveridge installed a \$40,000 Office Archiver 2000 optical disk storage system from Image Management Systems, Inc. (IMS) in Providence, R.I., on an experimental basis.

"We were initially thinking of using the system for office archival environments," Loveridge explains, "but found our people still wanted to pull documents and alter them. We were negative about the write-once limitation, then we began to realize that this technology was still legitimate. We discovered that there is a heck of a lot of information that really only has to be written once and not changed," he exolains.

In the meantime, Loveridge says, the IMS system is being put to good use in the company's computer-aided design and manufacturing division where the system interfaces with a Wang Laboratories, Inc. VS 85 minicomputer to store hundreds of engineering drawings.

In fact, Loveridge estimates that 1G byte of optical disk storage can hold 10,000 to 20,000 such drawings. The drawings are called up periodically from the disk and sent in minutes to Wang minis and IBM Personal Computers in Otis's Japanese and West German divisions.

Greater use in firms

"There's no doubt in my mind that there's going to be a lot of optical disk use in corporations," Loveridge concludes.

He's not alone. The U.S. market for CD-ROM and larger optical disk systems, generally termed "jukeboxes," which can run into the hundreds of thousands of dollars, is estimated by The Yankee Group in Boston to reach \$2 billion by 1990.

IBM also entered the fray last month with its 3363 optical disk drive, a 200M-byte external drive for the company's new Personal System/2 microcomputer line. — SK

THE ANALYST WHO COULDN'T



Why was the mind of this thinking man blocked?

n the last issue you may have read about "The case of the raging CFO" and the headaches that he caused for MIS executives. We can still send you a copy of that case story if you missed it. (Just use the coupon.) But today, we'd like to share with you the story of a Fortune 500 company that couldn't add.

It is well worth reading. It will help you answer questions your CFO will probably ask you. It could save your company money. And, if you are like the professionals below, you could become a hero.

You will also learn about a new advanced financial software product called FASTAR, which was developed by Corporate Class Software, a subsidiary founded by the \$3 billion Celanese Corporation. Here's what happened.

The CFO of a \$3 billion-plus corporation knew there was good news and bad news lurking out among the company's divi-sions. The question was: How to get at it? His concern was painfully simple:

His analysts spent 85 percent of their time just gathering data from around th company. There was too little time left to analyze current business conditions. Management was making decisions par-tially blinded.

As one frustrated analyst put it: "There was so much time spent getting organized. Our driving thrust was supposed to be analyzing the business. Not putting numbers together."

TROUBLE, TROUBLE, TROUBLE.

Research by MIS executives soon uncovered the root cause.

Like most companies, financial information was spread out among the divisions of the corporation (there were divisions of the corporation (there were four major business groups, with more than 100 companies in all). And different departments used different systems to age the data.

To make matters worse, the finan-cial analysts themselves had created their

own little data empires on PCs, and some had built elaborate and very shaky pro-

The company just couldn't keep its numbers straight. Analysts sent data back and forth on pieces of paper. Some tried hoarding soon-out-of-date figures. Others, quietly, gave up.

What would you have done?

A STARTLING DISCOVERY.

The solution came from a company called

Corporate Class Software.

This company had developed a product known as FASTAR-Financial Application Solution to Analysis and Reporting-that was the first packaged tion to advanced applications.

No fourth generation languages

needed to perform advanced fi cial applications. No macros were necessary. And all data from FASTAR could be loaded onto Lotus 1-2-3 spreadsheets for work there. (Yes, we'd be skeptical too. You'll find out how all this was done in minute.) The results for the \$3 billion corporation were dramatic.
The CFO found that his company

was able to improve its financial produc-

tivity by 50 percent. Fifty-percent! Year-end reports that used to be available in early April, just prior to the annual meet-ing with shareholders, were now ready in February. And consolidations that used to take two in these days now took how to take two to three days now took hourswith more accurate content. (One way FASTAR makes consolidations more accu-rate is through a rigorous system of data checks that automatically check data

integrity.)
Analysts now had more time to do
what they were paid to do-analyze. (And
they were able to do this very easily as vou will soon see.)

How could all this be done?

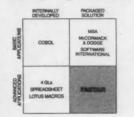
THE PRODUCT THAT ALMOST DEFIES

FASTAR acts as a bridge between PCs and mainframe financial production systems, such as the general ledger.

But it is more than a bridge. It is a ready-made solution for advanced financial applications that organizes data the same way that analysts are used to working with it-by financial schedule (incom statements, etc.), by organization entity (divisions, etc.), by period (day, week, month, etc.) and by type (any fourth type of data you choose such as actual, budget

or forecast.)
With the proper clearances, analysts can access financial information from any financial schedule for any company in the corporate structure. And they can analyze that information without ad hoc program ming. (Our powerful analysis package is built in, so there's no fourth generation language or macros programming needed. Even analysts who are computer illiterate can derive the same benefits from FASTAR as anyone else.)

What's more, the company now had the flexibility to assign new divisions and



product lines to analysts without taking time to reprogram the system. FASTAR is built to expand horizontally (for companes) and vertically (for rompa-nies) and vertically (for products). In vir-tually unlimited numbers. (Think of what this means for a company that reorganizes frequently. Or companies that change product lines often. Maybe a company like voues?)

DRING THE HURBERS BACK WHERE THEY BELONG.

FASTAR also addresses the critical issue of data integrity and control.

cause FASTAR takes all program ming off the spreadsheet, there are no undocumented programs to cause costly mistakes. (One analyst in another company had written a 1,000 line macros pro gram before management pulled the pli He was known as the analyst who knew too much. We can send you that case

FASTAR also eliminates the need for passing data back and forth on pieces of paper and having secretaries or analysts



STAR is the pachaged solution to adva plications that can provide quantitat in improvements in your company's fi

type them into spreadsheets. This reduces the number of potentially dangerous

errors that can occur.

And, maybe most important of all, because all financial information is stored in FASTAR's data base, MIS executives regain control of critical data.

You also protect all your company's investments. FASTAR accepts data from fourth generation language products and database management systems, as well as microcomputer applications. (None of the companies using FASTAR needed more than three days to adapt the program to their cornorate needs.)

In the final analysis, MIS executives show themselves to be strategic thinkers by giving analysts a tool to be more productive. (One company was able to per-form an ad hoc cost comparison in just minutes. Before FASTAR that same com-parison took a full day.)

You can see why financial professionals are interested in FASTAR. And why the chief financial officer of a \$3 billion com pany would put his reputation on the line to become chairman of our board of

But we think you have a lot of questions about FASTAR, too.

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NEWS & ANALYSIS

Neural networks gaining entry into MIS's world

Neural networks may help the future fi- and, like a neuron, each time one element nally catch up with MIS.

Neural network machines, also called neurocomputers, are multiprocessor machines that attempt to mimic the structure of a human brain. These systems consist of a great number of very inexpensive processing elements massively interconnected. Each processing element is supposed to act like an organic neuron.

takes an action, it can quickly affect every other element in the network.

In a neural network computer, then, processing and communication become the same. An application is a short-lived association of processors put together for that one task and then later dissolved.

Such machines reportedly are able to do things no conventional computer can.

Neural networks have demonstrated considerable powers of pattern recognition and reasoning with incomplete data. For instance, neural networks are said to be able to recognize a familiar human face even when part of the features are concealed.

And they can learn. Neural network machines would not even be programmed in the conventional sense. Rather, they would be "trained." The programmer would define the problem the computer would address and then present a number of possible solutions. The machine would "remember" those solutions as unique interconnections among its neurons and then "recall" them when necessary.

Until very recently, neural network

computers were confined to a few labs. However, that could all change by the end of the year. While neural network hardware is still in the development stage, it has become possible to simulate hardware

on more conventional machines.
One company, Nestor, Inc., located in Providence, R.I., offers software that effectively turns the IBM Personal Computer AT into a virtual neural network. Company officials freely admit they would rather be working on neural network hardware, but, in the meantime, their \$1,000 packages give the PC AT some of the pattern recognition punch of a neural network.

For instance. Nestor is about to market products that will allow the AT to learn and later recognize the handwriting of its owner. This would have applications ranging from data entry to security.

Nestor is also working on an expert system generator that will be able to learn by itself. In effect, it would be its own knowlege engineer. A human expert in some field could simply sit down at a keyboard and teach the system with repeated examples. One application already under development with the product is a mortgage risk-analysis system.

Another company getting into the neural network business is San Diego-based Hecht-Nielsen Neurocomputer Corp. (HNC). HNC markets a coprocessor for PC AT-compatible machines that has been optimized to run the differential equations of a neural network. For \$15,000, the company will sell you a complete neural network system composed of an AT-class machine, an HNC board and various system software.

Neural network seminars

For another \$15,000, you can attend a month-long seminar on neural networks and software. HNC officials say that students include Fortune 1,000 companies interested in the strategic use of informa-"You could take an entire data base of customer information and feed it to a neural network computer," explains Tony Materna, HNC's vice-president of product marketing. "The network machine could do a feature extract and put together a model of an average customer. Then, you could present the model with a hypothetical product, and see how the 'customer' would react.'

This area is where neural networks could become interesting to MIS officers. Increasingly, MIS managers are being asked to step out of their traditional functions. They are being asked to develop and maintain end-user systems - specifically, executive information systems with which individual managers may access mainframe data and analyze it according to their own individual perspective.

Neural network fans are proposing the machines as a way of building those extremely sophisticated end-user systems. Proponents suggest that eventually every computer will come complete with a neural network processor that would handle interface chores. It would shield the nontechnical end user from the operating environment and help perform strategic analysis. - MT

News section compiled by Computerworld Focus staff members Stan Kolodziej, Michael Tucker and Rebecca



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NEWS & AMAIYEE

What killed Enmasse Computer Corp.?

Technology, management, timing all played a crucial role in the company's demise

Multiprocessor technology offers a means for fault tolerance and faster processing at a lower cost. Some companies such as Tandem Computers, Inc. and Sequent Computer Systems, Inc. have successfully capitalized on these capabilities. Others, most recently Enmasse Computer Corp., have died trying.

A small part of these vendors' successes and failures can be linked to the technology they choose. However, the technology can only be considered in conjunction with two far more significant factors - management and timing.

Technology was one determining factor in the success of Sequent and the demise of Enmasse, which closed its doors in January 1987, according to Michael Simon, who became Sequent's vice-president of marketing after leaving that same position at Enmasse. Sequent's computers are tightly coupled and all the processors execute the same program, so the architecture does not require changes to the software, he explains. Therefore, it is as easy for applications developers to port software to the Sequent machines as it is to port it to single-processor systems.

By contrast, Simon says, the

Enmasse computers are loosely coupled. "The processors have to sort out pieces of applications. and they can't get at the same software." Because the processors only process certain pieces of applications, he explains, porting software to the Enmasse machine is harder and less cost-ef-

However, being loosely coupled or tightly coupled will not make or break a system, says Omri Serlin, who heads Itom International, a Los Altos, Calif.based research and consulting firm. "One of the most success ful multiprocessor computers is Tandem, and it's loosely coupled. It is a \$1 billion company,'

No third party required Loosely coupled machines are more difficult to develop, Serlin says. "It is much easier to automatically balance the application load among processors in a tightly coupled environment than a loosely coupled one," he explains. Thus, loosely coupled computers may require a greater systems software investment from the hardware vendor, but the computers do not require third-party vendors to modify their applications, he explains,

Timing and the investors' pa-

tience are more important factors, according to Serlin.

For Enmasse, investors were major factor, Simon agrees, but their concern was not the machine itself. "The Enmasse investor group [miscalculated] how long it would take the company to build credibility among usiness users and lost interest in giving Enmasse more time," Simon comments.

Another aspect of timing is a company's entry into the market. Tandem entered the on-line transaction processing market with a multiprocessor system in 1975 and basically had the market to itself for the next five years, Serlin says.

When Enmasse started in the 1982-1983 time frame, it did not have the same luxury of time, Serlin reports, "By that time, there were at least a dozen other firms with products along those including Tandem.

A final contributing factor is a company's management strate-gy, according to Simon. Enmasse attempted to sell into the commercial market without first establishing itself in other markets, he recalls. The problem, he says, is that business users are conservative. These users often base their decisions on the vendor's installed base and customer references

The circular nature of the problem was that because Enmasse was selling to conservative customers, it was having difficulty building that initial installed base.

Sequent avoided the circle by targeting scientific and engineering users. "Sequent more or less stumbled into the business market by accident," Serlin comments. According to Simon, Sequent's management realized that business users were interested in its computers because of the data bases available on it.

'Five of the top data base management systems run on Sequent's computers." Simon notes. Sequent is in a good position to target this market actively, he says, because it has a large installed base of scientific users that the business users can call.

Sequent's success in targeting business users is reflected by its installed base. At the start of 1986, Simon says, 80% of Sequent's computers were in-stalled in universities, centers for parallel processing research and software development companies. Commercial users accounted for the remainder. A year later, the vendor's installed base has shifted to an even 50-

Continued from page 13

DEC systems into IBM environments, especially [Systems Network Architecture]," Friedman

Joe Ribulla, manager of systems development at Sterling Drug, Inc., in New York, says he is skeptical of SAA because he has had problems with other IBM promises.

We were recently reviewing IBM's SQL, for example, and had trouble developing a simple query screen with it. IBM had about 10 IBM people in here, and even they couldn't do it. Finally, we solved the problem with [D&B Computing Services, Inc.'s] Nomad2. IBM's disappointed us before, and we're leery of something as large as SAA," Ribulla says.

Not everyone, however, is skeptical of IBM. "I think SAA is one of the most fundamental di-rections (IBM) has ever articulated." concludes Michael Killen, president of Killen & Associates, Inc., a Palo Alto, Calif., research firm.

"Remember, IBM is trying to tie its micro, mid-range and mainframe systems together across a lot of software boundaries. It will take years," Killen

In the meantime, IBM is all business. Within its bundle of April PC product announcements was the Graphics Presentation Manager, the first full implementation of SAA. The catch: It won't be available for at least a

Powerful chips threaten departmental systems

been the computer industry's darling for the last year. However, the machines that have received the most attention, such as the IBM 9370, are already under attack by increasingly powerful microprocessor-based systems. These systems could erode their pricing out from under machines like the 9370.

The best known of the new microprocessors is probably the 80386 from Intel Corp., although it is actually only one member of an entire generation of generic microprocessors.

individual computers, none of the current microprocessors can match the mainframe-like power of such systems as the 9370. However, in combination as multiprocessor systems, they can do quite well. "It isn't hard to link 10 or so together; you have a very powerful system," says Will Zachmann, vice-president of research for International Data Corp., located in Framingham, Mass.

Beyond multiprocessing systems, the individual chips and systems based on them are rapidly growing in power. Not only has the 80386 recently been upgraded, but its competitors have also been rapidly approaching minicomputer (or, in some cases, even mainframe) capacity. For example, the reduced instrucset computing (RISC)based, 32-bit Clipper chip set from Fairchild Semiconductor Corp. in Cupertino, Calif., continues to gain adherents despite a highly public debate over the sale of the company to a Japanese firm

The Clipper consists of two cache-memory management units and a single processing unit. The company claims the machine will operate at greater than five million instructions per second (MIPS). It runs the Unix operating system and has been widely identified with the Unixbased scientific and engineering market. However, Van Weathers, director of the business computer systems industry service for market research firm Dataquest, Inc. in San Jose, Calif., notes that it is in the lower end of the departmental market that Unix is making its strongest commercial showing. "The lower end of the departmental system is where Unix has its greatest penetration ... and that could make for some interesting complications," he says,

Meanwhile, another player is Mips Computer Systems, Inc., located in Sunnyvale, Calif. It, too, has a RISC-based processor. the R2000 series. The company says its chips will clock 10 MIPS.

Currently, the Mips chips are showing up most often in the scientific and technical markets. Last March, for instance, Natick. Mass.-hased Prime Computer. Inc. introduced a Mips chip-based three-dimensional graphics workstation, the PXCL 5500. Developed jointly with Silicon Graphics. Inc. of Mountain View, Calif., the \$74,900 workstation is said to be among the most powerful graphics engines available today.

The leap from technical to commercial systems is easier than one might think. Mips Computer also produces Mips chip kits for developers. In March, the company announced the M/800, an 8-MIPS system for OEMs that may be quickly configured for specialized applications. Priced at \$51,330 in quantities of 10, the M/800 comes standard with 8M bytes of main memory, a 12-slot Motorola. Inc. VMEbus card cage, a 337Mbyte hard disk and a 60M-byte 51/4-in, tape drive

The product also has extensive networking capability. Thus it could be turned into a departmental processor with very little effort on the part of a developer.

And progress in miniprocessor design is continuing apace. In March, Advanced Micro Devices. Inc., also of Sunnyvale, announced the AM29000, a 32-bit RISC processor that is supposed to render 17 MIPS. The vendor is openly talking about bringing mainframe and supercomputer performance to the desktop. The AM29000 is expected to ship by the year's end.

Increasingly, then, departmental computer vendors will be fighting a running battle with more powerful desktop systems. departmental partisans may, in fact, have a considerable handicap. Their systems are much more expensive than desktop machines and, therefore, far more difficult to discard in favor of an upgraded system. - MT

Update

Continued from page 13 of IDMS/SQL is also under de-

velopment.

In a separate report, Cincom Systems, Inc. of Cincinnati has announced that it will add IBM IMS and DB2 support to its Su-pra relational DBMS.

Control Data introduces scaled-down Cybers

Control Data Corp., developers of the Cyber line of supercomputers, has introduced its first departmental system, a scaleddown version of the Cybers. Base price for the 1.8 million instructions per second (MIPS). 8M-byte, entry-level Cyber 930-11 is \$59,900. The 3-MIPS 930-31 starts at \$125,900.

Significant in the announcement is the ability, through shells, for users of CDC's NOS/VE operating system to program with Unix and within Digital Equipment Corp.'s VMS operating system with NOS/VE coordinating the background commands. - SK



Departmental computing's political paradox

BY STAN KOLODZIEJ

epartmental computing is a hard beast to pin down.

Vendors of local-area networks (LAN) tend to define departmental computing in their own images, as do vendors of minicomputers, microcomputers, relational data base systems, fourth-generation

languages and even mainframes

That's to be expected. But it makes definitions and analysis tricky. Though many industry watchers disagree on the forces shaping departmental computing, its effects across corporate America are becoming obvious. Like invisible currents beneath a relatively calm sea, this movement may not be apparent to MIS until MIS gets caught in it.

In many ways, the current emphasis on departmental computing has its roots in the MIS backlash against distributed computing's last hurrah of mass corporate micro purchases in the early 1980s. The reaction by MIS was severe enough to put a damper on the entire computer industry. It has also radically altered the rules of the computer game. The years of 30% to 40% industry growth are in the past.

"You can kiss those days goodbye," explains Dan Hosage, president and chief executive officer of Davox Corp., a Billerica, Mass., maker of integrated voice and data workstations. "The business world has changed. It's no longer willing to experiment, and there's no money around. Everybody has made investments in computer equipment, and many have had reputations damaged, made mistakes. Some [of these mistakes] have been critical."

In this new get-tough-with-vendors age, MIS is looking a long time before they leap into computer purchases of any size machine.

Upper management has given MIS a mandate to control budgets, vendor selection, equipment selection and software selection and to screen user demands closely. MIS is taking its time, making sure most things fit snugly within a grand corporate processing scheme.

The MIS emphasis on centralized control is a strong force that might on the surface seem to work against departmental computing. However, ironically, MIS is helping make departmental computing possible.

Let's back up a little bit. The idea of distributed computing, whose origins began with the placement of terminals on the desks of clerical and keypunch operators in the 1970s,

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STRATEGIC PLANNING

gained widespread momentum until it ultimately culminated in the broad dispersion (some MIS personnel would say flood) of microcomputers into the hands of eager, but still generally unsophisticated, corporate users.

Rallying point for MIS

On hindsight, this rush to put micros on every corporate desk has become a kind of rallying point for MIS. "The present stance of MIS [toward micros] was forged as a reaction to those days of micro purchasing," explains Leon Jackson, senior research analyst at Arthur D. Little, Inc. in Cambridge, Mass.

Roger Peterson, director of information systems at Kawasaki Motors Corp., located in Santa

Ana, Calif., agrees.

"Though we [MIS] use fourth-generation languages at the departmental level," Peterson explains, "we also use a close, centralized approach. We've had some problems with data bases at the micro level in the past that we don't want repeated."

If there is a big difference between distributed and departmental computing, it is in the level of user sophistication. The passage of time and the spread of corporate — and often MISsanctioned — information centers has noticeably raised the overall level of user sophistication in departments both with micros and with larger systems.

"Many users are now progressing past the information center concept," Jackson says. "These centers become limited as soon as you leave microcomputers for larger systems. There are numerous departments that are implementing pretty advanced minicomputer-based departmental installations with applications written in fourthgeneration languages. These are beyond the means of most information centers."

This growing user expertise represents a powerful counter-vailing force that in many instances has blunted, or at least taken much of the wind out of, the push by MIS toward centralized control.

'A lot of compromises'

"What we're seeing are a lot of compromises on the part of departments and MIS," explains Van Weathers, director of the business computer systems industry service at Dataquest, Inc., a San Jose, Calif., research firm. "I don't think it's really an adversarial situation. MIS has control over big systems. Now they are becoming key members of department vendor selection and purchasing groups. MIS is still defining the overall data structure, setting up the rules for data access and setting network standards under which departmental systems will operate. 'On the other hand, departmental user groups have been getting more leeway in the types of applications they can develop. It's give and take. However, I think the end result is more teamwork."

Jackson concurs. "MIS has given up some control at the departmental level with workstations, but in return, MIS has won the ability to impose standards and control of networks," Jackson says. "It's a case of you take that but give us this. In a way, however, I think it returns more power to MIS."

Jackson puts his idea into historical perspective. "First there was technical computing, then office automation with firms like Wang Laboratories, Inc. and then came the personal computers. In all three cases, I think, MIS came out the loser," Jackson says.

Computing's future

"During the past three years, however, everything has become integration, and the only computer force that can provide integration is MIS. In the end, what MIS is really giving up is user application development. That might not seem important, but it could have a large influence on how corporate computing is structured in the future."

And that structure, Jackson emphasizes, will reflect the growing importance of depart-

mental computing.

"Everything boils up to the head of the department who finds that if he wants something done in computing he can suddenly do it himself without MIS's help," Jackson says. "The department head will get up the nerve to go to the president and say, 'Look, this is how we can do it.' The bullets are being made by department professionals, but the gun is being made by department heads."

Weathers claims MIS is still slow to warm up to departmental computing for several reasons. Near the top of the list, he suggests, would be the fear of losing control.

"However, the closer MIS looks at departmental computing, the more it becomes necessary and makes sense," Weathers says. "It's a question of economics. End users want better applications, and they want them fast. MIS can't keep up with the load. They see that for relatively little money they can now install departmental systems such as Digital Equipment Corp.'s Microvax II to handle departmental applications yet still maintain control.

"How do they maintain control? IBM has defined the corporate processing environment. Almost everything has to fit into that environment eventually. Departmental systems by necessity are emphasizing connection to IBM mainframe environments, mainly into IBM's Sys-

tems Network Architecture. Those are the standards MIS knows and feels comfortable with. Under these conditions the specter of departmental computing is suddenly not so bad for MIS," Weathers concludes.

Most vendors and analysts agree upon much of this reasoning behind departmental computing. What they do not agree upon are the modi operandi, or the technologies, by which departmental computing will be

the current market for relational data bases as competitive and "incestuous." She says departmental computing will quicken with the appearance of complete IBM SQL-based data bases on micros.

"Relational data bases are coming down from mainframes to minicomputers," Atre says. "Few people paid much attention to the DEC minicomputer environment before, and now DEC's VAXs and VMS have

"The head of the department finds that if he wants something done in computing he can suddenly do it himself without MIS's help. The bullets are being made by department professionals, but the gun is being made by department heads."

LEON JACKSON ARTHUR D. LITTLE, INC.

carried out. The tendency to define departmental computing by vendor is very prevalent.

Ian Ebel, president of Microserv Technologies Corp., a value-added reseller of LANs, sees departmental computing as a logical extension of LANs.

"Departmental networks are growing. LAN vendors and value-added resellers are offering the kind of vertical software that departmental knowledge work-

ers need.

"You can see the departmental strategy of vendors changing. DEC, for example, is now beginning to play up its networking to show connectivity between its systems. Other vendors are doing the same. The weight of the market is pushing toward networking solutions. The advent of [networking] standards such as the Transmission Control Protocol/Internet Protocol is helping network manufacturers leverage development costs."

Hal Elgie, a computer consultant based in Fairfield, Iowa, points to LAN developments such as The Coordinator, a networking product from Novell, Inc. that Elgie says takes a more qualitative approach to departmental communications.

"So many LANs are basically glorified electronic mail systems," Elgie says. "I think we'll begin to see more departmental products like The Coordinator that actually structure the way users put together information before communicating it.

"The whole issue," he adds, "is revolving around the users now, no longer the technology. MIS people and department heads I work with are realizing that any work group situation is a management/people situation. There are fewer people being blinded by technology for its own sake."

Shaku Atre, president of Atre International Consultants, Inc., located in Rye, N.Y., classifies joined IBM [offerings] as de facto standards for data bases. DEC RMS files are now a must, like IBM's VSAM, for departmental computing."

Atre adds that a large part of departmental computing will involve moving data back and forth between DEC and IBM systems and between DEC/IBM and other, multivendor environments. Currently, however, Atre claims, there is more smoke than fire in distributed data base solutions. Vendors still need to iron out items such as global data dictionaries and the installation of LANs and network architectures that will provide true distributed, not remote, data.

Atre also says that distributed data bases will probably help bring departmental/MIS differ-

ences to a head.

"Corporations will have to referee site autonomy, or they will not be able to distribute data base systems," Atre claims. "You can be sure that a corporation's major MIS personnel in New York, Chicago and San Francisco are going to fight to keep individual control of their own data or, at least, want to oversee its dispersal. There's going to be trouble both within and outside departments."

Certainly one of the most significant forces behind departmental computing is the appearance of better software development tools, which have resulted in the ability to bring much of the development cycle to the departmental level.

"I think departmental computing is influencing a lot of vendors in the fourth-generation language market," explains Peter Burris, a research analyst at International Data Corp. of Framingham, Mass. "A lot of traditional fourth-generation language mainframe vendors such as Software AG of North America, Inc. and Cincom Systems, Inc. are drifting their development systems — through DEC

machines — down into departments and information centers. What they're doing is putting a lot of pressure on traditional information center fourth-generation language vendors such as Information Builders, Inc."

To accomplish this, Burris says, the vendors are toning down their products and gearing them toward unsophisticated (in comparison with MIS) users at the departmental level.

Another important promising to pay departmental computing dividends is something called user interface management systems, which are an offshoot of computer-aided software engineering research. Advanced user interface management systems enable a programmer to generate skeleton source code for a working prototype, submit the prototyping to departmental users for testing and repeat the process until all parties are satisfied. At this point, the programmer can insert application-specific code and create the completed application

"What this means is that programmers can establish more upfront relationships with users. It will help give cohesion between users and programmers with department settings," explains Gilbert Cardwell, president of Precision Visuals, Inc. in Boulder. Colo.

Maybe so, but Davox's Hosage is quick to point out that there is no universal panacea for departmental computing.

'Valhalla in the sky'

"The days when technology alone was considered the great Valhalla in the sky are gone," Hosage claims. "There will never be one set of functionality that will cover most departmental needs. The key to it all is to remember that not all departments are equal, and neither are all departmental applications for that matter."

Hosage claims that in the year 2020 there will still be the equivalent of the typing pool.

"Some things will never change. The last people we sell to now [are those] in a company that handle technology. Nobody in technology seems to know who has responsibility for buying things. We go instead to the businessman, the vice-president of the collection department, the vice-president of sales and so on," Hosage says.

"Those vendors that are successful are going to be the ones that sell systems solutions, not big technology," he explains.

Whatever future directions departmental computing takes, one thing is clear, Jackson says. "Departmental users have been busy installing some substantial computer power over the years. Now they want to do something with it. And MIS is finally giving them the chance."

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Mid-range vendors fight for office turf

BY SANDY AUSTIN

he computer industry is in the midst of turmoil over the role departmental systems should play in the corporate computing landscape. Many believe the traditional scenario of a minicomputer connected to terminals running department-specific applications and data bases will fade out. In its place they see a new set of priorities brought on by the proliferation of personal computers.

PC users require not only connectivity to each other in the local work group setting but also a means to assimilate themselves into the overall corporate computing environment.

puting environment.
MIS managers face
the challenge of bringing those resources
closer to individuals
without making technical support, system
maintenance and communications costs skyrocket. Computer ven-

dors must scramble to unite PC users and the legions of MIS through systems solutions. Whether it is a top-down approach in which system architectures are extended downward to the departmental processor to institute a single operating system and set of applications across the product line or a bottom-up strategy such as the one 32-bit micros promise to deliver, the market's attention is focused on the departmental processor as the bridge between the micro and mainframe worlds.

IBM's actions will be the gauge by which MIS and vendors will judge the departmental climate. In a move that was both a defensive strike against well-positioned Digital Equipment Corp. and an acknowledgement of user

launched its plan to open the 370 mainframe architecture and port it down to the 9370 mid-range processor. Theoretically, by opening up its veteran mainframe environment, IBM is making available a minicomputer that utilizes the same operating system as the larger machine and will run hundreds of software applications already in use on main-

frames throughout the country.

If executed well, the 9370 will go far toward satisfying user demands for a unified systems approach. It will also give a shot in the arm to value-added resellers and third-party software and hardware developers that will clamor to provide support for the system. Originally scheduled for shipment about a year after announcement, IBM recently moved up its availability schedule. According to an IBM spokesman, 9370 Models 20 and 60 will be available by July, Models 40 and 90 by October.

DEC's threatening VAX attack was a strong motivator for IBM. The \$7.5 billion Maynard, Mass., company has been gearing up to grab a large chunk of the business departmental market since 1985. Its VAX series, which employs the same software throughout, coupled with its strong multivendor networking strategy, has



Austin is a Boston-based free-lance business and technology writer. She has covered the industry for five years.

The 9370's fate

In-depth coverage of IBM's

Special Section. Page 29.

9370 strategy in this month's

indeed had an impact on Big Blue's financial health. While IBM experienced a drop in mid-range systems sales in the last six months, sales in that area by DEC, as well as by Hewlett-Packard Co., have swelled.

"The 9370 was a reaction [by IBM] to DEC's position in the marketplace," asserts Marty Gruhn, vice-president of Tempe, Ariz.-based research firm The Sierra Group.

Kimball Brown, industry analyst for research firm Dataquest in Cupertino, Calif., agrees that IBM came under market pressure to introduce a serious midrange strategy. "IBM would have gone along with its two-tier architecture [utilizing the 3270 terminal emulation method of mainframe access] indefinitely," he says. "IBM has finally come around to the fact that it has to address user needs," he says. But the Armonk giant risks losing mainframe sales to the 9370 because if customers view the machine as a replace-

ment for the 4300, it represents a much cheaper processing option.

DEC, for its part, feels that IBM has not really offered an open systems solution. In-

stead, "it has taken the first step toward offering the kind of solution DEC offers now," says David Toub, market manager for DEC's Business Office and Information Systems. According to Toub, there is

a major difference between the way IBM and DEC view and implement networking. "IBM's hierarchical networking scheme, which is basically a traffic-routing method, limits freedom of access to

users. DEC's, which is based on a peer-to-peer scheme, allows users to communicate to anyone anytime via any route available. This difference will limit IBM's ability to succeed." ac-

cording to Toub.

Analysts agree that the 9370 is targeted primarily at entrenched IBM mainframe customers who want to leverage investments in systems, software and staff. "It only really makes sense if you have the 370 at the mainframe level," Dataquest's Brown says. Dataquest predicts that 5,000 to 10,000 9370 units will be shipped this year, while Brian Jeffery, managing director of Los Altos, Calif-based research firm International Technology Group expects a maximum of 2,500 shipments. "Because of the public statements by IBM and the press attention, people are rushing to put in orders. But because of the long lead time, many of those are soft," Jeffery explains.

If IBM's statement of the 9370's position is clear, the machine's real-world role is less so. "The primary problem with the departmental/mid-range market is that vendors are not distinguishing between remote-site and departmental [office] applications," Jeffery says. If the 9370 is slated as a departmental processor, how well can it be received with its limited office automation software offerings? Aside from IBM's Professional Office System and Displaywrite, the 9370 will have an OA system called the Solution Pak Office Series. Scheduled to be available in August, the VM-based system will range from \$51,690 for the 9370 to \$157,095 for the 370 for the base system, which includes electronic mail, text, notes and calendar features. Options will include a relational data base management system and query and decision support facilities.

Still, analysts question the efficiency of a 9370's OA resources against a VAX running DEC's All-In-1 or a Data General Corp. MV running DG's Comprehensive Electronic Office (CEO). True, the 9370 will, in time, have a wide variety of 370 applications ported to it, but what is the practicality of these products in the department? "I'm not sure the world is crying out for VM on a departmental machine," Jeffery states. "For the price, it's not a great value."

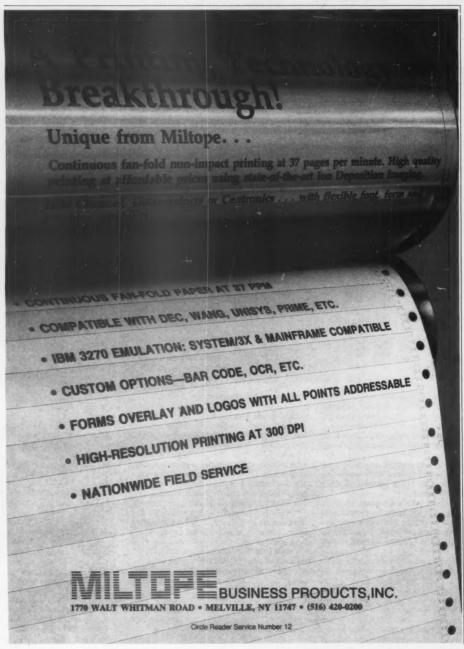
Support costs a concern

Support costs are another critical concern, particularly in cases in which the 9370 will be placed in a distributed system or at remote sites not connected to a mainframe. "With MIS managers pushed to hold support costs down, the last thing they need is to hire a new staff of operators for the 9370," says Bob Ano, vice-president of corporate marketing for Wang Laboratories, Inc. According to IBM, the VM/Integrated System operating system will not require skilled systems programmers and operators to function. However, the 9370 is expected to run up higher support and maintenance costs than IBM's other mid-range systems, the System/36 and 38.

But within large, IBM mainframe-oriented firms, which are the 9370's prime targets, support costs will be much less of an issue because the system can be supported remotely from an IBM mainframe.

From recent indications, the 9370 will bear little impact on the System/36 and 38. Because these systems are based on an architecture that has nothing to do with the 370, it seems clear that IBM intends to keep the two product lines separate while continuing to profit from the alternative appeal of the System/36.

"IBM needs a box like the System/36," Brown says. "The company sold 120,000 of them in the last three years." Of the System/36s out there, two-thirds of the machines are being used in remote-site applications. That is a popular application for the 36 because it is



reliable, user-friendly and does not require skilled data processing personnel to operate. IBM continues to enhance the System/36 and allegedly intends to merge the System/36 and System/38 architectures sometime in 1988.

System/36 upgrades

PC-to-minicomputer connectivity, a vital concern for the departmental computing issue, is one that IBM is addressing in its System/36 recent enhancements. PC Support/36, which costs \$3,000, is a minicomputer software package that promises to make it easier for PC users to transfer data from a System/36 file to a PC file. This action occurs by storing both files on the System/36 in a shared folder and by providing one menu and one user interface to communicate between the systems.

DEC, however, is taking the micro-to-mini connection further. The company, which already has an impressive networking scheme between its VAX minicomputers and IBM PCs via Decnet, has a new family of mini and micro software products called VAX/VMS Services.

Ranging dramatically in price from \$650 to \$19,500 depending on system configuration, VAX/VMS Services was designed to simplify communications between a PC and a VAX network as well as between individual PCs on the network. Thus, PC users have access to common PC or VAX files (stored on the VAX), enabling easier data transfer between Microsoft Corp. MS-DOS and VAX applications.

DEC has also made Microsoft Windows available, which means that users have the option of running concurrent live mini/micro applications. In addition, DEC's Vaxmate microcomputer has been optimized with network software, MS-DOS and a keyboard equipped with both IBM PC and DEC micro orientations to be installed on a DEC network.

Each vendor's micro-to-mini strategy provides the critical ability to allow PC applications to reside on the larger disk drives of the departmental mini whereby a much smoother, simpler transfer of data is possible. This one feature makes great strides in improving PC connectivity at the departmental level and, ultimately, in broadening end-user access to corporate resources.

Certainly the real contest being waged on the departmental minicomputer front is between IBM and DEC. But that's not to say that other minicomputer vendors like HP, DG and Wang are rolling over and playing dead. In fact, most view the 9370 and the departmental strategy that it represents as a long-awaited blessing. Not only has the 9370 renewed interest in and legiti-

mized departmental systems, but it also places these systems in a position to benefit from an already strong commitment to communicating with the IBM world.

'With so much activity and technological growth happening today, a vacuum has been created. Users have no real departmental solutions yet," asserts Ken Hunt, product line manager of the computer systems division at HP. Hunt says that because IBM has such a strong MIS orientation and has brought this mind-set to the department level, the 9370 is really a much more powerful, expensive system than many users need. That strategy has left the door open for vendors like HP to fill the needs of smaller technical users at remote sites not connected to a mainframe.

The real contest in the departmental minicomputer front is between IBM and DEC. But that's not to say that other vendors like HP, DG and Wang are rolling over and playing dead.

DEC is really in a stronger position than HP to capitalize on this small user market because, according to Hunt, "we got caught in the midst of converting our systems over to a reduced instruction set computing (RISC)-based architecture. [But] so far we have had a good reception to the new 840 [HP's first RISC-based system]."

DG describes its overall departmental strategy as one that grasps the whole integration of the PC through a local-area network to the departmental processor," according to Chris Stone, manager of DG's office systems software. DG is also very committed to existing in the IBM world. Because the 4300 and System/36's architectures were difficult for other vendors to connect with, the sales of these systems were somewhat limited. Stone says.

DG had a lot of problems connecting to IBM, he explains, but now with the aid of the 9370 and DG's existing communications links, the firm is hoping for an easier time. Stone cautions against getting overly ambitious in trying to offer the complete departmental solution, however. "Minicomputer vendors must realize that they cannot be all things to all people."

DG stresses its MV/2000 to MV/20000 line of minicomputers. CEO software that runs on

the entire MV series and the importance of ensuring that the most popular PC-DOS or MS-DOS applications are supported. DG reportedly currently has those capabilities via CEO Connection, an asynchronous interface between CEO and MS-DOS applications. The problem, however, is that asynchronous communications are very slow. Hinting at new products that will address the area of IBM PC integration to its departmental system, Stone remains optimistic.

Citing Wang's distributed intelligence architecture as one of the firm's superior strengths, Wang's Ano sees the company's minicomputers taking on multiple purposes. "We can handle the classic minicomputer funcdepartmental data hases, mainframe data base query and office automation applications - in addition to integrat-PCs ing via departmental software and PC file and peripheral sharing.'

Not surprisingly, Wang, along with DG and other veteran minicomputer vendors, disagree with industry watchers who see the traditional departmental functions of minicomputers becoming obsolete. "The PC user is certainly taking more control, but there is still a real need for department-specific data bases," Ano says.

For example, when customers buy a number of stand-alone PCs and decide to tie them together, they have two choices: either to go with a file server product from companies such as Banyan Systems, Inc. or Novell, Inc. that provides a simple means of communicating between PCs connected to a central server; or to go with a departmental minicomputer.

The latter choice, Ano argues, is a more complete solution because it combines PC-to-PC communications plus all the classic OA and data base access benefits. "PC Loops [file servers] were not designed to handle departmental application file and record locking," he says.

Wang rivals IBM, DEC?

Within that context, Wang says it feels it has a better mini architecture than either IBM or DEC for integrating PCs into a department network. According to Ano, DEC's CPU-intensive architecture -- many processors connected asynchronously to dumb terminals — is too slow and does not function well when dealing with a mix of jobs. IBM's batch-oriented, high-volume transaction processing presents the same problem, Ano claims. Wang asserts that by distributing its intelligence throughout the system and connecting hubs via high-speed Wangnet links, it does a better job of supporting a variety of end-user applications with good response times.

Another trend affecting de-

partmental computing — the emergence of 32-bit microcomputers based on Intel Corp.'s 80386 processor — addresses the bottom-up side of the issue.

IBM's chief PC competitor, Compaq Computer Corp., kicked off the action in the 80386 market in September 1986 with its Deskpro 386. Since then, 45 companies have jumped on the bandwagon with intentions to develop similar systems, and 15 have actually delivered 386-based systems to market. According to San Jose, Calif.-based research firm Creative Strategies International, 35 to 40 386-based micros will be available by year's end, with a total of 250,000 units sold.

Vendor benchmarks indicate the 386 systems have four to five times faster processing speeds than the preceding Intel 80286-based micros, and the 386 machines will run existing software applications two to three times faster. Thus, in a typical application, by replacing an IBM Personal Computer AT or compatible as a file server on a local-area network, a 386 micro will increase performance and double user capacity.

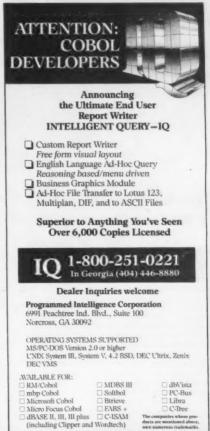
One glaring problem with an otherwise sound system is that the 386 has an almost total lack

of software. The systems available today use a slightly amended version of standard MS-DOS 3.1. But the operating systems and networking software being developed to exploit the multitasking, multiuser power of the 386 are still on the drawing board. So for now and the indefinite future, 386 micros are restricted to being just faster stand-alone PCs.

Crippled products

"That whole family of products is crippled at this time," says Clare Fleig, director of systems research for International Technology Group. "There's a lot of development going on. Minicomputer software vendors, such as Oracle Corp. and MCBA, Inc., are porting applications down to the 386, and scores of micro software vendors are writing packages," she observes. But, until a real operating system is available to which users can write applications, developers are shooting in the dark.

Microsoft is holding the bag. A new MS-DOS that unleashes the multitasking features of both the 286 and 386 processors is still a year away from general release. Microsoft, realizing the negative impact of the interminable delay, is trying to speed up



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the process. "We realize that when we release the operating system, users will need applications to run on it. So, a software developer's release (tool kit) will be ready in the next five months," says Mark Mackaman, Microsoft's MS-DOS product

Once available, this MS-DOS will have a protected-mode environment. This feature, which is native to the 286-based micro, allows for true multitasking to occur as memory addresses for individual applications are protected. Thus, when the system is handling multiple tasks, it automatically keeps one application from trashing another. The new operating system will also provide application management services such as interapplication

communications, messages between applications, multiple task scheduler and memory allocation management.

The memory allocator is important because it allows users to share or borrow memory. If a user is running an application, for example, and needs more than the allocated 640K bytes of memory, the system will provide it.

'A ''mini'' minicomputer'

"The 386 micro has the potential of sitting at the heart of a multiuser system. When you get into protected mode [multiple processing], what you have is a "mini" minicomputer — not a supermicro," says Tim Bajarin, executive vice-president of Creative Strategies International in Santa Clara Calif.

Indeed, the potential is there for the 386-based micro to become a competitor of the departmental mini or to assume the role of a secondary department processor. "If the 386 gets a good operating system, strong data communications gateways, more storage and more peripheral support, then it will look very much like a mini," HP's Hunt asserts. Above all, communications is key because that is the vehicle for hooking into the corporate network.

If 386s do evolve into "mini" minis, what would be the deciding factor to influence their purchase? "It comes down to the same issue that minicomputer vendors face: operating system compatibility

across the product line," Hunt explains.
This is where IBM's 386 strategy en-

ters the picture.

IBM introduced its 386 offering on April 2. Speculation is rife about how the machine will affect the industry as a whole. Most analysts are in agreement that Big Blue's new Personal System/2 series will do something to shut out other micro competitors. "IBM has got to add value in the system to give its corporate customers a reason to buy from them instead of Compaq," Fleig says. "It has promised its customers a universal interface, and they need a PC tied into the network."

And, in fact, the new machines seem to give IBM a channel for that added value. They make extensive use of custom very large-scale integration chips, for example. At the offical introduction of the machines, Entry Systems Division President William Lowe noted that some 80% of the new high-end PCs were "IBM added-value" systems.

Analysts agree that IBM has worked hard to build communications features into the hardware and operating systems of the new machines. At the announcement, the machines were called full participants in IBM's Systems Application Architecture. However, what that means remains unclear. Dataquest's Brown, for instance, speculates that IBM will set up no correlation between its 386 and 9370 strategies. "If IBM has anything to do with it, the 386 will always be a single-user system. The cannibalization between the two is just too intense."

However, Brown does see IBM's operating system taking on some communications conduits to larger systems, such as VM, Systems Network Architecture and the Token-Ring, while maintaining MS-DOS compatibility.

'Technology run amok'

By contrast, The Sierra Group's Gruhn views IBM's Personal System/2 as a "highly integrated extension of the 9370 strategy. IBM is through with presenting its users with islands of technology run amok."

In short, judging from the diverse commentary, whether IBM will poise its 386 system as a secondary processor in a departmental network or go the stand-alone route is anybody's guess. In the end, users will decide how best to fit the 386based system to their needs.

One given is that its offering will always maintain compatibility with the body of MS-DOS software in use today. To that extent, at least, IBM will join hands with the rest of the PC competitors.

With the departmental computing market just beginning to evolve in terms of technology breakthroughs, product an ouncements and software standards, the whole computer community has more questions than there are answers. With IBM's 9370 and its Personal System/2 not yet delivered and new MS-DOS software standards a year or more from general release, MIS is at a juncture where it can begin to plan strategies but not actually implement them.

The short term may be frustrating as we all wait for the other shoe to drop. But long-term strategies, aimed at tightening the ties between individuals, their departmental work groups and the corporate information network, are a lot closer than previously imagined.



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Confessions of departmental users

A report on MIS users' motives for selecting a particular office solution

BY REBECCA HURST

he departmental system Roger Vermillion set up for the Time Insurance Co. in Milwaukee is not the same as the one James Ryan developed for the Washington Utilities and Transportation Commission in Olympia, Wash. And neither of these systems mirrors the departmental computing solution that Doran Butler introduced into Datagraphix, Inc. in San Diego.

Apparently, these firms are not alone. Most companies use standard system components in-cluding minicomputers, personal computers, terminals and local-area networks (LAN). However, each uses these building blocks to develop a variety of implementations that fall under the heading of departmental computing.

One reason for this customization is that departmental computing is a catch-all phrase. It describes all processing that does not take place back in a computer room, according to John Mc-Carthy, research manager for Forrester Re-search, Inc. in Cambridge, Mass. "First, it was called distributed processing, then office automation and now departmental computing," Mc-Carthy explains. "Eventually, it will be called something else." Thus, departmental solutions encompass every hardware and software combination that can conceivably fit into one of these categories.

More importantly, the wide-ranging needs of users among companies and even among departments within the same companies demand varying solutions. "You can't shove one solution down all users' throats, or they'll revolt," McCarthy claims. Instead, managers must examine both the individual and group needs of us-

Users that are information-entry-oriented may be best served by a microcomputer-tomainframe solution, according to McCarthy. Applications for these systems may include order entry for payroll, accounts payable and receivable, inventory control and general ledger, says Van Weathers, director of the Business Computer Systems Industry Service at Dataquest, Inc. in San Jose, Calif.

However, micro-to-mainframe solutions carry a few problems, particularly when users move from order-entry to file transfer. The primary concern of users who own such systems is security, according to Forrester's February "Professional Automation Report" (see Chart 1 page 26). Simple terminal emulation programs pose a minimal threat to security, the study notes. If users are moving files between their PCs and the mainframe, though, "tracking and keeping two data sets synchronized can be a major stumbling block," it says.

Another concern is the micro-tomainframe link's inability to provide simple data transfer, McCarthy states. How ever, users currently appear to have little choice. "There's not much users can do about file transfer," McCarthy says. "It's a slow, com-

plex operation.

Departmental office automation users may only need terminal access to a mini, McCarthy says. Common applications for these systems word processing and electronic mail, Weathers notes. However, as minicomputer users require additional applications, such as a spreadsheet, they may replace their terminals with personal computers.

PC users in a department may need a PC LAN with a microcomputer that can act as a file, print, communications or data base server, ac cording to Weathers. Over time, these PC LAN users may need to replace the micro with a minicomputer server as their data base needs grow more sophisticated, McCarthy notes

The Forrester study respondents report

Hurst is a Computerworld Focus senior writer.



USER SURVEY

that a shared data base ranked second in importance to a minicomputer's mainframe communications capabilities (see Chart 2 this page). Despite the importance users place on a mini's communications canabilities, users assigned them lower ratings than the preceding year.

One factor for this declining status is the lack of communications solutions from mini vendors. "The mini is becoming a PC concentrator and gateway, but mini vendors have been slow to embrace the necessary functions ' McCarthy explains. Many of these functions, according to the report, only became available in the fourth quarter of 1986. Another factor is that many users are still focusing on LAN and Irma-type emulation solu-

tions, Forrester states More often than having to choose one departmental approach and its attendant weaknesses, though, users must bring together a combination of computing resources to provide a complete solution.

Of the users who spoke with Computerworld cus, two elements - PCs and mainframes - cropped up as a common part of each user's system. However, the way in which these sys

tems are integrated varies noticeably from company to company as does the extent of the system's present or intended

Minis reduce paper load

When Time Insurance decided it needed to reduce its reliance on the company installed Data General Corp. minicomputers, according to Vermillion, Time's office information systems director. Today, these computers function primarily as a time-sharing system. However, the DG computers also act as a server for some PC users and will soon become a gateway to the corporate mainframe as well

Time Insurance runs 130 DG D470C color dumb terminals off MV/10000 linked to an MV/20000. The company uses the terminals for basic office automation functions such as electronic mail, word processing

and messaging.
There are also 24 IBM PCs



INFORMATION PROVIDED BY FORRESTER RESEARCH, INC. Chart 1

for users who need more advanced applications such as spreadsheets. For the PCs. the DG system serves as the hub of a LAN, acting as a file server and gateway, Vermillion says.

Although terminals far outnumber PCs, Time Insurance set out to implement a system that would support both, Vermillion says. The firm already had PCs

and wanted to preserve them.

In addition, he says, wanted to assure ourselves that tying in our PCs would be relatively easy to do." Another purchase factor was the availability of integrated software.

Time looked at IBM, DG and Digital Equipment Corp. before choosing DG's hardware and software, Vermillion says, "We liked the integrated software of DEC and DG, but DG's fit our environment best." He adds that at the time the company assessed departmental products, IBM had proposed the System/36, but it lacked similar

software functionality. Using the DG system, Time Insurance has begun to address various departmental processes, Vermillion says. For example, the insurance firm is beginning to eliminate certain business forms as well as delays caused by mail. As a result. the company is compressing the cycle time of its insurance procedures, he reports

Time's next project is bridging its departmental processes with the corporate data base by using the MV/20000 as a gateway to the company's IBM 3081 Model KX mainframe. "The mainframe data base is the

source of all key data regarding the business, and most people need access to that data." Vermillion explains. By using the mini as a gateway, employees can use one workstation to access any resource, he says.

The insurance company's use of a mini in conjunction with a mainframe corresponds with a

trend Dataquest's Weathers sees in the relationship between these computing resources. "The existence and growth of the mini has put a larger demand on the mainframe to control the network," he says. This, in turn, will accelerate the growth of the mainframe environment.

One company apparently bucking the mini-to-main frame trend is the Washington Utilities and Transportation Commission.

The commission began in

1981 with a LAN based on a Datapoint Corp. minicomputer, but in 1985, it began INFORMATION PROVIDED BY FORRESTER RESEARCH, INC. phasing in a PC LAN. We've had good success with the Datapoint network," explains Ryan, senior systems analyst for the Utilites and Transportation Commission. However, he notes, "The network has not kept up with software and hardware technology trends and is no longer cost-ef-

The replacement network is a Novell, Inc. LAN running the vendor's G-Net Plus and IBM Systems Network Architecture

fective.

(SNA) gateway software. A Compaq Computer Corp. Deskpro PC based on an Intel Corp. 80286 chip with a network interface board acts as the LAN's single communications server.

The nondedicated Compag server also provides tape backup and file transfer. The network currently has 30 to 40 Compag dual-floppy or 20M-byte, hard-disk PCs. Rvan estimates. Of these, approximately 75% have been moved from the Datapoint network.

To support further migration to the Novell network, the commission will add an Intel 80386 based Compaq file server. The organization will also double the number of PCs on the LAN within the next 18 months. Rvan savs

This process will coincide with the commission's development of new applications and moving of old ones from the Datapoint system. In a year, the agency will also bridge the two networks with Ethernet, Ryan predicts.

Little mainframe use

Employees of the Washington Utilities and Transportation Commission often work with spreadsheets, Ryan reports, and the PC LAN permits them to access a shared data base and to share files, he says. Such departmental functions constitute the major use of the system. "Mainframe use is almost zero," Ryan comments.

Still, some employees use the LAN's SNA gateway to access the IBM 3081 Model MP in the Washington state service center. These users are running IBM CICS and providing data en-

Importance of functions

File backur

minicomputers provide PCs

ortune 1,000 firms

Datagraphix, a San Diego-based division of Anacomp. Inc., is heavily geared toward mainframe applications, reports Butler, computer systems specialist for General Dynamics Data Systems. Although General Dynamics sold Datagraphix to Anacomp in March, it still services its former division

A PC LAN solution

To handle the mainframe functions, users have IBM 3270 Personal Computer XTs residing on a Fox Research, Inc. 10-Net LAN. These PCs communicate through an IBM 3270 controller to an IBM 3081 or 3090 mainframe. The network also cludes a laser printer and "Turbo XT" PC clone with a tape unit to handle tape backup.

Until two or three years ago, Datagraphix used IBM 3270 terminals, but it switched to 3270 PC XTs when users began to request Microsoft Corp. MS-DOSbased applications such as Lotus Development Corp. 1-2-3 and Ashton-Tate Multimate.

The company chose IBM's 3270-PC because it provides four mainframe session windows and one for PC sessions. Users generally run CICS in three of the windows and IBM TSO in the fourth. Butler says. In addition, the 3270-PC allows users to hotkey quickly between the mainframe and PC sessions.

The 3270-PC is a more expensive solution than a PC with 3270 emulation, but for years it was the only complete solution, Butler says.

When Datagraphix first needed a combined PC and 3270, no other firms provided products with multiple mainframe ses-

sions, he explains. For the last six months, though, Datagraphix has been getting the same functionality for less money by using a Forte Communications Co. 3270 emulation card on a Person al Computer XT or AT.

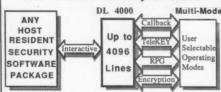
The Fox network was not the company's first choice, Butler notes. Datagraphix also tried using Ungerman-Bass, Inc. Arcnet with a Banyan Systems, Inc. server and IBM's Token-Ring, but neither allowed peer-to-peer communications. The first Fox 10-Net network required Datagraphix to make a few minor board modifications to operate fully, but 10-Net has since modified its own boards.

Despite the differences in approaches among Datagraphix, the Washington commission and Time Insurance, the organizations share similar experiences in terms of cost benefits. All three noted that combining local, departmental and corporate functions on a PC saved them the cost of having two devices on users' desks. They also cited the

Continued on page 27

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try. Ryan says: they are not developing new mainframe applications. In fact, the commission is porting some of its mainframe applications to the PCs. "We'll never get away completely from the mainframe, though," he states. "Our statewide personnel accounting systems are simply too big for the LAN."

Unlike Time Insurance or the Washington state commission,

DSER SURVEY

Minis down, not out

or departmental computing, 1986 was a year of contradiction, according to a February 1987 survey of Fortune 1,000 users conducted by Forrester Research, Inc. of Cambridge, Mass

While the use of minicomputers did not drop, the mini's importance as a communications server did, according to Forrester's "Professional Automation Report."

Two factors accounted for this decline, Forrester claims. First, users are focusing on local-area networks (LAN) and terminal emulation solutions. Second, minicomputer vendors did not provide many of the functions users require until late

However, the apparent decrease in the importance of the mini's role is tempo-

> "During the next few years, there will be a drive toward PCs and LANs as an alternative to emulation as PC users build their experience."

JOHN MCCARTHY FORRESTER RESEARCH, INC.

rary, according to John McCarthy, Forrester's research manager. This year departmental users can purchase advanced personal computer-to-mini communications products such as Digital Equipment Corp.'s VMS Services for MS-DOS, he

In addition, he says, some minicomput-er vendors have begun to evolve the mini from a time-share system to a server for **PCs**

"The future role of the mini is less as an applications engine than as a communi-cations engine," McCarthy asserts. Vendors that fail to understand this change in users' needs will not survive, he warns.

The ratings for PC-to-mainframe con-nections and LANs reveal fluctuations in

Continued from page 26

ability to share peripherals, particularly printers.

Among the companies, though, there were differences in the degree of cost savings. The Washington commission no-ticed immediate savings. "Implementing the SNA network had a 30-day payback, Ryan says. "It's been phenomenal.

Datagraphix's benefits are less defined. The goal, according to Butler, was adding enhanced features rather than cutting costs. However, the Forte boards are allowing the company to realize some sayings over the price of an IBM 3270-PC.

Quantifying benefits

Similarly, the cost benefits of Time's departmental system are difficult to quanti-"It's difficult to measure because you're not implementing the system to let people go," Vermillion explains.

Instead, he says, managers have to look at the additional work absorbed by people using the devices. There are some benefits at the individual level, but when the system is used to address organizationwide processes, Vermillion claims, "that's when you see the real payoff."

In Forrester's 1986 survey, 86% of the users surveyed said they employed micro-to-mainframe links, an increase of 23% over the previous year. At the same time, LAN usage dropped from 55% to 47%

Like the minicomputer ratings drop. the decrease in LAN use is a short-term phenomenon, McCarthy says. "The dip in LAN use is largely attributable to IBM's Token-Ring," he says. The Forrester survey quoted one user as explaining. "We tried IBM's Token-Ring Network, but we decided against it because it was too slow and expensive." However, IBM is upgrading the Token-Ring, McCarthy

Furthermore, the use of PC-to-mainframe links will begin to decrease as users replace them with LANs, Forrester pre-

Terminal emulation

Most of these links consist of terminal emulation, McCarthy says. MIS supports this emulation, he claims, because "MIS knows and loves the IBM 3270 and the mainframe.

In addition, he says, "It's a way for them to maintain control." However, MIS and end users are beginning to realize the limits of terminal emulation.

"During the next few years, there will be a drive toward PCs and LANs as an alternative to emulation as PC users build their experience," McCarthy asserts. "Users are realizing that it's ridiculous to send information to the mainframe so that the mainframe can send it to the user next

Additionally, problems associated with LANs are falling to the wayside. Until recently, McCarthy recalls, networks provided only base-line functions. "Now there are more LAN-based applications that will run on top of the network soft-ware," he explains. Also, he says, as vendors focus on solutions, they work on bringing costs down. - REBECCA HURST



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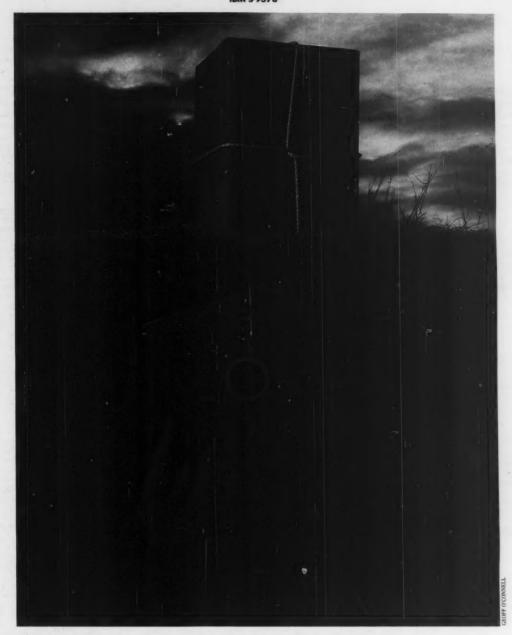
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SPECIAL SECTION

DEPARTMENTAL COMPUTING

IBM'S 9370



The 9370: Packaging more power for MIS

BY MICHAEL TUCKER FEATURES EDITOR

ast October 7, IBM introduced the 9370 departmental computer. Users, developers and analysts agree that as IBM's chief entry into the emerging depart-mental computer market, the 9370 could shape the nature of corporate computing in America for years to come.

But how the industry will be tical to multiuser, small business changed remains an open question. As vet few users have seen the machine - large-scale deliveries are not expected until late this year - and so most MIS officers can only guess how the product will be used. Some analysts and software developers have been able to experiment with the 9370, but they remain deeply divided on how the machine will fit into the corporate computing world.

A popular view of departmen-

computers - that is, machines rather like very large personal computers. They have an open architecture, are user-friendly to a fault, invest a lot of resources on the human interface, have a wide variety of prepackaged software available and, most of all, may be operated independently of the central MIS department.

However, the battle lines are drawn over the definition of departmental computing. The two tal systems is that they are iden- camps include on one side those rect, then the departmental

who feel that the 9370 will be like the IBM Personal Computer, a relatively foolproof system meant for relatively independent

end users and on the other those who feel that it will be a mainframe in miniature. complete with systems administrators business. Page 33. and centralized control from MIS.

Inside: IBM 9370 product manager on the 9370's role in

Whichever analysis is right could have long-reaching consequences. If the PC model is corIBM'S 9370

The 9370 line-up: Facts and figures

THERE ARE CURRENTLY four 9370 models:

• Model 20. A low-end 9370, the Model 20 comes with a choice of 4M to 16M bytes of memory. It is not particularly expandable. However, like all 9370s, it will support VM, VSE and IX/370. Prices range from \$31,000 to \$51,000.

· Model 40. A mid-range system, this 9370

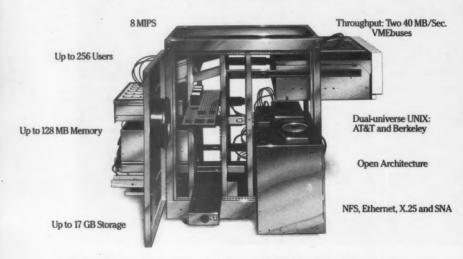
comes with 8M to 16M bytes of memory. It is easily upgraded and contains an expansion bus. Prices range from \$65,000 to \$85,000.

• Model 60. IBM also considers this model a mid-range system. It has 8M to 16M bytes of memory plus an additional cache memory of 16K bytes. In addition to VM and VSE, it will support IBM's

MVS/SP. Prices range from \$93,000 to \$113,000.

• Model 90. The Model 90 contains everything the other 9370s have plus extra expansion and storage options. Up to 54 devices may be attached via special I/O cards. It is, in effect, the closest thing to a full 370 mainframe in the line. Prices range from \$190,000 to \$210,000. - MICHAEL TUCKER

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computer managers. If the mainframe model is right, then MIS could use the 9370 to reestablish its authority over computing thoughout an organization. Given the small number of people who have actually dealt with the machine, the best measure to determine which camp is correct may be to look at the kind of soft-

computing market would be as chaotic as the PC market has been with the balance of power shifting further still from MIS officers and toward end users and micro-

ware being written for the 9370. One can learn much about the way the machine will be used from the assumptions of developers working with it. Reportedly, several thousand 9370s have already been ordered by MIS de-

partments around the country and the world. However, as yet only a handful have been delivered. Most of those machines have gone to software develop-

ment firms.

Kimball Brown, an analyst with the San Jose, Calif.-based market research firm Dataquest, Inc., explains, "The 9370 has a long way to go before it is a departmental system. There just aren't any applications." That is the sort of charge that could be leveled against any new machine, but Brown insists the growth issue here has much broader implications. "The real challenge is turning IBM from a hardware company to a software company."

A shift to software

Brown is one of many observers who believes that IBM has set out on a major undertaking to shift a large part of its revenue away from hardware and toward software. He points out that IBM recently abandoned leasing as a preferred way of doing business. Brown also notes that tax reform as well as the increasing obsolescence of IBM's older machines have made leasing more and more unsatisfactory from an IBM accountant's point of view. Software, however, can be a lucrative re-placement for leasing in IBM's search for

According to Brown, "Software is great. You get a one-time-only sale fee, true, but then after that there's a monthly maintainance fee, plus consulting, plus upgrades. It's a steady stream of money. By the 1990s, I think you'll see a 50-50 mix of IBM's revenue - half hardware and half software.'

IBM has not been noted for its sales of applications software. But, Brown points out that IBM has been purchasing software companies of late and beefing up its internal development efforts. Moreover, there is one area - systems software in which IBM has both a strong history and a solid product line. "I think they've IBM'S 9370

learned from their PC experience," Brown says. "I think this machine [the 9370] will be cloned like the PC. But, each time a clone is sold, IBM will sell an operating system."

Indeed, he hints that IBM's big problem with the 9370 will not be hardware clones but software vendors venturing onto its turf. "People will start sticking their own Unix on it and other operating systems," Brown says.

But, in the meantime, a department manager cannot purchase a 9370, set it up in an office and expect to find a large library of packaged software as he might with a Unix or Microsoft Corp. MS-DOSbased system. "(The 9370) should be a hot box," Brown claims, "but right now, VM is a very immature environment."

There is, of course, no lack of volunteers eager to help VM grow up. Software vendors are lining up to write for the 9370. And it's significant to note from where these vendors come.

One possible source of software for the 9370 could be PC applications vendors moving their single-user products to departmental settings. For PC software developers, which already have a long-standing relationship with IBM and its machines, the 9370 would seem to be a tailor-made method of extending their spreadsheets, word processors and so forth to departmental systems. However, few PC software developers have become involved with the machine so far.

Another group that could logically be expected to support the 9370 is applications developers already working with departmental systems. While this group is showing an interest in the 9370, it is treating the machine very differently from the way it might treat some Unixbased small business computers.

Access Technology, Inc., located in Natick, Mass., for example, markets a spreadsheet for departmental systems. Originally designed for the Unix environment, the product has been ported to a number of other systems, particularly Digital Equipment Corp. Microvaxes.

Play in Big Blue universe

Access said it was quite happy to see an IBM machine. For the first time, the company can play in the Big Blue universe, and a VM version of its spreadsheet is already in the works. Explains Carl Nelson, Access's vice-president of marketing, "Because our software directly addresses the end users, the smaller the machine, the better our sales."

But, Access is clearly not going to treat the 9370 as though end users or micromanagers will run it. "The opportunities for and problems of the 9370 do revolve around how good a departmental machine it is going to be," Nelson says. "[The 9370] does have some things against it. The VM interface is simply not going to be as friendly as [that of] other systems. We've invested a lot of time and effort in this [interface]. There's just nothing you can do to make [the 9370] as attractive as a PC to the end user."

Nelson says the 9370's advantage is in its connectivity. "The positive point is that it is IBM and has links to IBM main-frames."

As such, Nelson simply does not see the system running independently of MIS. "I expect most 9370s will be sold into existing IBM accounts, just as most Microvax 2000s are being sold into existing DEC accounts," he says.

Contenders for the departmental crown

IT IS BY NO MEANS assured that the 9370 will dominate the departmental computing market as the IBM Personal Computer did the personal computing market.

The 9370 enters a market that already contains some powerful players, including the following:

• The DCS 6000 series from Canaan Computer Corp. in Trumbull, Conn. Early in the game, several vendors realized that 32-bit microcomputers could play the role of departmental systems fairly easily. Canaan Computer produces what are effectively micro plug-compatible machines, that is, VM/CMS-compatible microcomputers that run mainframe software. Last January, Canaan responded to the introduction of the 9370 with the DCS 6000 series. Canaan claims that one of the 6000 machines, the 6100, supports 12 users at a cost of \$63,000, while the 9370 supports 12 users at a cost of \$63,000.

 The VAX family of computers from Digital Equipment Corp. headquartered in Maynard, Mass. There are now VAX machines in almost every role of computing, from desktop to mainframe. It is the breadth of this product line that gives MIS officers the power to link end users to central mainframes that forced IBM into departmental computing in the first place.

Unix-based 32-bit systems, such as the Cubix 3 from L/F Technologies, Inc. in Carson City, Nev., form a general alternative to the 9370. While such machines are not as easily integrated into IBM environments as IBM machines, they still offer high levels of connectivity as a result of their origins in the scientific and engineering environments.

 The microprocessor in general, as represented by the MIPS chip and some systems based on it from MIPS Computer Systems, Inc.

The 9370's greatest rival may be the combination of time and technology. Large shipments of the 9370 are not expected until late 1987, yet systems based on increasingly powerful microprocessors are already on the market, and more are coming. The 9370, the departmental mainframe, could well be overshadowed by the desktop mainframe. — MICHAEL TUCKER

Another departmental vendor that may become involved with the 9370 is Incormix Software, Inc. of Menlo Park, Calif. Informix has two product lines: the Informix relational data base management system and a newly introduced group of tools for managing IBM's DB2 applications on IBM mainframes. It is Informix's DBMS that has been the company's bread and butter for years. It is a successful, user-friendly product that has been ported to a large number of small business machines including IBM Personal Computer AT systems.

Significantly, however, Informix's activity with the 9370 is coming out of its mainframe shop rather than its small business computer operation. Notes Dick Heermance, Informix's product manager for mainframe products, "Our interest in [the 9370 is] very high. I think it's a wonderful machine. On our next round of products, we're going to consider the VM market strongly."

He also says that the 9370 may be a deliberately un-PC-like machine. "I think IBM saw that users wanted a machine that would link their PCs with their mainframe. I also think IBM saw that [Intel Corp.] 80386-based systems were starting to take over that role. What I suspect, anyway, is that rather than let the PC grow into that [micro management] box, it introduced the 9370," he says.

But the single most active group of software vendors in the 9370 market is almost certainly the mainframe software vendors. It is these companies that have all the advantages — they already have VM-based products and they already have ongoing relationships with MIS shops.

This group's only disadvantage is that it does not have strong contacts with end users. If the 9370 is an end-user-oriented machine, then the mainframe applications vendors are in trouble. They could now be logically expected to engage in a race to open channels of distribution.

In point of fact, however, they are not. For example, SAS Institute, Inc.,

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IBM's 9370

located in Cary, N.C., markets a number of interface and DBMS products for IBM mainframes. Like much of the industry, SAS intends to port its products to the 9370. "We don't have a machine inhouse. Like everyone else we have one on order," says lone Cockrelle, vice-president of marketing. "We do not expect it to be difficult to port our products to the machine"

When asked if SAS predicts difficulty in marketing 9370 products to departmental users, she says, "I think there are two parts to your question: Is it really a departmental system, and how would we be affected if it were? I don't think it is a departmental system, not in the sense of a machine that MIS won't control. I think

MIS will be very involved with the machine. In fact, I think it would work particularly well in a situation in which you have a centralized data base and then departments accessing it."

She adds that even if the 9370 were a truly departmental system, her company would not be greatly troubled. "We've already had experience selling to technical end users... though I will admit, we may need a little time cultivating contacts in

that group," she says.

Part of the plan

But, Cockrelle says she firmly believes that MIS will be involved with the 9370 and may even use the machine to control departmental computing. "The big question is how easy it is going to be to support that box. Can you really put it in a corner and just dust it off now and then? I doubt it. Maybe that's all part of the plan. You offer a box that provides departmental computing but that also requires lots of input from MIS."

Meanwhile, Princeton, N.J.-based Applied Data Research, Inc. does have a 9370 in-house and has already announced plans for the machine. Tony Percy, Applied Data Research's director of product planning, also does not expect any marketing problems. "I think the channels of distribution and support will be much different. The acquisition and management of software will still be done by MIS. It's certainly not going to be an alien environ-

ment for us, much less so than if we tried to enter the DEC market."

Percy thinks the machine probably could be operated unattended by MIS but probably not under VM. "I think it could still be [an unattended system] but only if it has an office automation-oriented task. And, for that, people may decide to go with VSE. Recent figures, partly IBM's and partly our own informal numbers, suggest that 50% of 9370 installations may go with VSE," he says.

One observer without doubts about the 9370's ability to operate unattended under VM is Ronald P. Kral, vice-president of strategic marketing for VM Software, Inc. in Reston, Va. "I've been around VM for 14 years, and I know of at least one company that was running a VM system unattended 12 years ago," he says. In fact, VM Software's biggest task will be to make its mainframe products more capable of running without attention. "What we need to do now is finetune our products so that they need less care and feeding," Kral says.

But that doesn't mean Kral sees the

But that doesn't mean Kral sees the machine running in mom-and-pop shops, "IBM is going to be selling these ma-

"The big question is how easy it is going to be to support that box. Can you really put [the 9370] in a corner and just dust it off now and then? I doubt it."

IONE COCKRELLE SAS INSTITUTE, INC.

chines to its existing customers, corporations with deep pockets," he says.

Kral expects end users to be less, not more, involved with computing as a result of the 9370. "IBM is becoming aware of the fact that the end user has to be isolated from the operating environment. You can't have your staff learning new operating systems every time you introduce a new system or upgrade," he says.

The Ultimate Corp., based in East Hanover, N.J., is one of the first 9370 value-added resellers (VAR). It says it expects to start delivering its 9370-based product late in the year. Ultimate is unusual in that it remarkets hardware equipped with the Ultimate operating system, its own version of Pick Systems' Pick operating system. Pick is said to be simple, easy to use, forgiving of error and, yet, remarkably powerful.

Ultimate has made its fortune remarketing Pick-equipped micros, minis and mainframes. The firm has now ported Pick to the 9370. If the 9370 is going to run independently of MIS, it will do so thanks to user-friendly software such as Pick. Indeed, Pick seems perfect for small business computers far removed from systems managers.

But, Ultimate does not see itself selling to small business computer installations alone. "The 9370 will allow us to enter the market that has always demanded IBM," says James W. Daly, Ultimate's director of IBM products. "We'll be running Pick as a guest on VM, and we'll be able to use the communications facilities built into VM. We'll be able to communicate upward to mainframes. We've already got Pick running on 4300s."

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IRM'S 9370

In short, there is substantial evidence the 9370 is not a departmental system, at least, not as the public defines one. It is not a stand-alone system that will threaten MIS's position by providing a new center of computing power within the corporate organization. It is not going to run in total isolation of MIS.

Instead, the 9370 will run as an outlying part of a distributed computing situation. It will rely on a central, mainframe data base for strategic input and on central MIS for strategic services

Whether this was the result of a deliberate plan on IBM's part to support MIS against micro managers and departmental system officers is a moot point. Whether by design or accident, the nature of the 9370 could shift the balance of power back to MIS. At the very least, it will prevent the growth of rival centers of influence at the departmental level and, at most, could vastly increase MIS's ability to control desktop systems.

One of the few MIS officers who has

seen the system but who asked not to be named may have described the 9370 situation best. He says, "Think of it as a bulldozer or maybe a snowplow. Either way, it's driving through a field of PCs and pushing them up, in big drifts on either side. Behind it, stretching as far as the eye can see, is a nice empty road, where you finally have room to move."

Large system gains for mid-range users

BY E. F. BERNHARDT SPECIAL TO CW FOCUS

IN A COMPETITIVE BUSINESS environment, increased productivity is the key to success. The MIS manager charged with raising user productivity should address productivity at three levels: organizational, departmental and personal. Departmental systems increase productivity by bringing to work groups the productivity gains made possible at the organizational level by large systems and at the individual level by personal

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Bernhardt is the product manager for IBM's 9370 line.

- Environment: suitable for general office areas, laboratories or the plant floor.
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The perfect fit

Shared-processing minis vs. PC LANs

BY MICHAEL DURR

he two primary technologies competing as departmental systems are the microcomputer-based local-area network (LAN) and the shared-processing minicomputer. Because both systems have certain advantages, the choice for users is often difficult.

Several issues can affect the selection of a technology, and one of the most difficult issues to resolve is which architecture is better suited to a company's applications.

A LAN consists of microcomputer workstations connected to a central file server. Each workstation has

a low to moderate performance CPU and local memory for running applications. The file server manages the network and disk access.

LAN transmission bandwidth is high, usually

1M bit/sec. or greater. This bandwidth is used primarily for the transmission of data and programs to and from magnetic storage in the server.

A minicomputer network is based on a central unit, the minicomputer, which acts as a host machine to attached workstations. The mini contains a high-speed CPU, memory and magnetic storage. Application processing is executed in the minicomputer. Workstations, or terminals, are capable only of displaying data and accepting user input.

Terminals and minicomputer connections occur at low to moderate speed, usually 9.6K bit/sec. These connections are used for the transfer of

display data, screen control codes and user input.

The functions of a minicomputer network and a LAN are virtually identical: They both support data processing and a network of enduser workstations. But the way these two architectures operate is different.

LANs have a wide transmission bandwidth, which is necessary to handle large data transfers between the PC workstation and file serv-

er. These transfers occur when the workstation downloads applications from the server and uploads and downloads data files. Large numbers of batch transfers and applications that re-

quire heavy disk I/O can degrade system performance, especially on low-speed LANs.

Because application processing occurs within the PC workstation, applications that require little disk I/O have a negligible impact on LAN performance.

Transmission bandwidth on a minicomputer network is in the low to moderate range. Unlike the LAN, the minicomputer bandwidth must support all screen display changes. When the quantity of screen I/O is heavy, performance bottlenecks can easily result because of insufficient transmission bandwidth. Operations that

are screen I/O intensive include text input, screen attributes, cursor control and windowing.

Traditionally, the minicomputer is more

powerful than any single micro workstation on the LAN. A LAN, however, usually has much greater total processing power than the mini, based on the aggregate capability of all the micros on the LAN. Applications that can use aggregate processing usually perform better on LANs than on minis.

If an application performs many small operations, these operations can usually be distributed among micro workstations, utilizing the total processing capability of the LAN. If an application performs one or two large operations, aggregate processing capability is not a factor.

Word processing, for example, involves a lot of screen manipulation, minimal text processing and

minimal disk I/O. When a minicomputer system does word processing, the screen manipulation and other operations for all terminals on the system must occur in the minicomputer host. Because of their heavy processor utilization, active word processing terminals can degrade the performance of a small minicomputer network.

On a LAN, word processing utilizes the collective processing capability of the networked microcomputers. Each microcomputer workstation easily handles word processing for a single user. And because the amount of traffic on the LAN is small, most LANs can support

Durr is senior technical analyst for Novell, Inc. located in

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dozens of word processing workstations.

Other applications cannot use aggregate processing. Automated report generation or inventory updates, for example, are executed in a single machine. Having multiple processors on the network will not affect the performance of these operations. The only relevant factor is the performance of the machine that executes the program. In this case, the minicomputer usually will outperform the LAN.

Word processing, spreadsheet modeling and office automation applications including project management and electronic mail can, in general, take advantage of aggregate processing and are best suited to LANs. Econometric and other large-scale modeling, high-resolution graphics and many manufacturing applications require a high-performance processor and are best suited to mini systems.

A data base system is often the primary application in a multiuser network. While a system comparison will show that many applications are suited to either the LAN or minicomputer architecture, the data base system resists easy categorization.

Initiating a resource utilization profile can help with this analysis. The profile can match a data base system to the system architecture just as less complex applications are matched to architectures.

To develop a resource utilization profile, one can look at a specific data base application. An order entry system is a good example. The following analysis is of a typical order entry system with 31 workstations, 25 of which are active each day.

An order entry application is a set of transaction-oriented programs that runs mostly during the day. These programs consist of order entry and order maintenance. Order entry occupies

90% of the total time divided between entry and maintenance. Additionally, order entry requires that an update program be run periodically, which is a batch process that updates the customer's accounts receivable file, the sales analysis file and inventory. The system must also process management reports.

Traffic on this transactionoriented system primarily consists of new orders. An order has two sections.

The first section is the header of the order, and the second section is the detail part of the order. The header includes the bill-to address, the ship-to address

and any special instructions.

In a typical order entry situation, 70% of the time the customer number is entered and the full header returned to the computer. That is approximately a transfer of 20 bytes from the end user and 300 bytes coming back from the network in the course of 15 seconds.

During 10% of the time, users can do a cross-reference operation. For example, the customer gives his name but doesn't know what his number is. Rather than assign him a new number, the end-user does a cross-reference scan, looking at all the names that are similar.

DDM cornerstone of IBM remote file access plans

BY DONALD H. CZUBEK SPECIAL TO CW FOCUS

ONE OF THE KEYS to the successful use of departmental computers in large networks is the ability to share data between remote systems. This means not only sharing data among the departmental processors but also allowing access to mainframe-based data and allowing personal computers to share this network resource.

IBM's primary strategy and technology for remote file access is the Distributed Data Management (DDM) architecture. DDM has been formally defined by IBM and is implemented in Big Blue's System/36 and System/38 departmental processors as well as in the IBM Personal Computer and on mainframes under CICS.

DDM is integrated into the file systems of IBM's departmental processors to give applications true transparent access to remote files. The term "transparent data access" is thrown around pretty loosely in the industry, but in the case of the System/36 and System/38, this phrase applies. Because DDM is buried within the standard file systems of the System/36 and 38 processors, existing applications can access data on any networked DDM system as if it were just another local file.

How is transparency achieved? When the application programs running on the System/36 and 38 issue an I/O request, such as a request to open a file, the operating system first checks whether it is a local file. If it is, the I/O operation proceeds normally without DDM involvement. DDM comes into play only when the file cannot be found locally.

In this case, the I/O request is turned over to DDM, which uses a directory of remote resources to locate the file. If it is found to be located on a remote DDM system, the DDM software transforms the local I/O request into equivalent DDM commands and transmits them to the remote system using Systems Network Architecture LU6.2 communications.

The remote DDM system services the request and uses DDM protocols to return the results to the system that initiated the request. The results of the I/O operation are returned to the application

Czubek is president of Gen2 Ventures in Saratoga, Calif.

program, which is not notified that the requested operation was performed on a remote system.

DDM defines the protocols that are used to perform remote file operations including Open/Close, Read/Write and file transfer operations. One of DDM's most powerful features is that it defines machine- and operating system-independent file structures. This makes file operations across dissimilar systems possible. For example, System/36 applications can access files on System/38s and on mainframes via CICS.

The file structures that are supported by DDM include sequential and random files that can be accessed by relative record number or key. It is important to note that DDM was not designed for remote data base access; it is limited to recordoriented file systems similar to VSAM.

IBM products that currently support DDM have varying capabilities that affect the ways in which DDM can be used on each system.

There are two basic levels of DDM capability — Source and Target systems. A DDM Source system is capable of accessing DDM files on remote systems. A Target system is capable of responding to remote file requests from DDM Source systems and acts essentially as a file server.

Products supporting DDM can either be Source systems, Target systems or a combination of the two. The IBM System/36 and System/38 have both Source and Target capability, allowing applications to access remote DDM files and to respond to DDM file requests. IBM's departmental processors support DDM as symmetrical peers.

Because IBM's other DDM products do not support both levels of DDM capability, they have more narrowly defined roles in DDM networks. The CICS implementation of DDM provides only Target capability.

The host, therefore, acts as a file server to departmental processors and PCs.

The PC, on the other hand, supports only DDM Source functions, which means PCs must depend on departmental processors and mainframes to provide file server functions.

Application transparency and data interchange among dissimilar remote systems constitute the good news about DDM. However, there is also some bad news.

The first drawback the application designer encounters with DDM capability (and any other remote file access mechanism) is reduced application performance. Accessing data across a communications network will almost always be slower than for similar access to local files.

The frequency of access to the remote files is a key design issue. DDM is fine for infrequent access to large files, but if the remote file is frequently accessed, the designer should consider simply transferring the entire file or a portion of it once and then reaping the performance benefits for local file

The price users pay for DDM is in the complexity of configuration management. Directories of remote files that must exist at each DDM node are not created automatically — far from it. Network administrators must define a list of remote files at each DDM node. This is not a great problem for small networks, but it quickly becomes a coordination nightmare as the network grows and changes configuration. In time, the system will have to be enhanced with global directory systems to minimize this problem.

As for the future of DDM, expect to see DDM implementations in IBM's other departmental processors and in versions of its PC. The current version of DDM on the PC is not integrated with the operating system's file system as it is on the departmental systems. This is mainly because of deficiencies in the operating system, such as a lack of record-oriented I/O.

Expect also to see DDM implementations on non-IBM products. Unix systems already have their own remote file access technologies, including the Sun Microsystems, Inc. Network File System and AT&T Remote File System. Large IBM networks that use Unix-based departmental processors will require DDM support to gain critical access to mainframe-based data files. In the International Standards Organization's Open Systems Interconnect (OSI) world, links between DDM and FTAM will permit data sharing between OSI products and existing IBM networks. DDM will be an important element on the departmental computing scene for some time to come.

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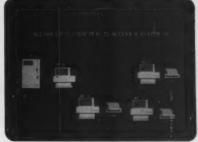
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Windows with multiple host sessions



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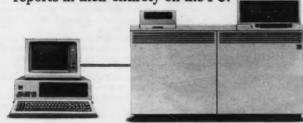
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ARCHITECTURE UPDATE

This activity requires a considerably greater amount of information coming across the network, probably in the range of 5K bytes or 50 packets of data. Therefore, about 10% of the time, 5K-byte transfers are necessary to do an order header. It will take 30 seconds of user time to create an order header.

The remaining 20% of the time the header is fully keyed in by the end user. This requires a transfer of 300 bytes and

takes 45 seconds.

The body of the order consists of a group of order lines. These are also relatively small packets, although inventory records could be quite large. Some firms have master inventory records of 500 to 1.000 bytes.

In this sample order entry application, an average order contains 30 items. The transfer of each line takes 600 bytes. The application needs 600 bytes in 6 seconds to fill up a line of the order. With 30 items, the process requires the transfer of 18K bytes in 180 seconds.

The above figures are used in calculating the total transfer load. The body is a constant 18K bytes transferred in 18c seconds. The header time and number of bytes varies as explained previously.

According to these figures, the system requires a transfer of 91.27 bytes per user per second. With 25 users, the total system load is 2.3K byte/sec. (or 18.4K bit/sec.). These figures represent a maximum load assuming that all users are ac-

tive simultaneously. Such volume is unlikely to happen during a sustained period; however, it does provide a potential load figure for the resource utilization profile.

If this rate were sustained, it would mean that the office would be handling more than 330 orders per hour, an unreal-istically high volume for 25 users. A more reasonable figure is 100 orders per hour for six hours, or a total daily production of 600 orders with an average of 30 entries per order.

This figure, 600 orders, can be used to estimate the batch processing profile. Each order is 18K bytes in size, so the total daily volume is 10.8M bytes of data.

Daily processing is normally required in an order entry system for inventory up-

date and sales analysis. An update requires one Read and one Write operation, moving the data between the storage disk and the computer four times for the daily processing.

With information on system usage, it is now possible to build a resource utilization profile and compare that with system

architectures as follows:

• Screen I/O. Order entry, along with most other transaction-oriented applications, has a heavy amount of screen manipulation. An order entry screen is painted, then the end user enters data.

ed, then the end user enters data.

On a LAN, the screen manipulation and often the editing are done at the PC workstation, creating virtually no system overhead. On a minicomputer system, screen manipulation and editing are performed at the min host.

 Transmission bandwidth. The data transmission bandwidth requirement, as detailed above, is 18.4K bit/sec. That number represents actual information passed through the network.

The minicomputer system uses additional bandwidth for screen I/O and for the data entry screen itself. Screen commands must be sent from the terminal to the minicomputer, adding to the bandwidth utilization. Also, a new screen usually is transmitted to a terminal every time data is entered. On the LAN, screens are generated by the PC-resident application and do not become part of the network traffic.

In this transaction-oriented order entry application, the amount of bandwidth utilization is probably two to three times greater for the minicomputer system than it is for the LAN.

Batch processing. On the minicomputer, batch processes are performed entirely within the minicomputer and dissubsystem. On the LAN, the batch processing is performed in a microcomputer workstation. Frequent communication is probably required between the LAN and the disk subsystem across the network. Based on their respective architectures, the minicomputer is therefore more efficient than the LAN for batch processing.

In the sample order entry system, two Read and two Write operations must be performed on 10.8M bytes of data. The total transfer equals 43.2M bytes of data. Using an Intel Corp. 80286 or 80386 machine for batch processing, the LAN should be able to perform the operation at approximately 50K bytes per second, completing the job in less than 20 minutes. A minicomputer of a size recommended for 31 workstations would probably complete the processing in one-half to one-third the time required by the LAN.

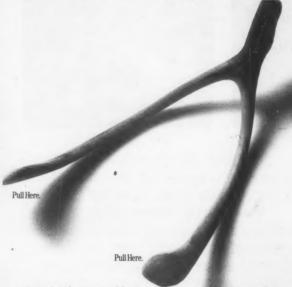
No effect on order processing

Most batch processing in an order entry environment occurs after normal working hours. The batch processing, therefore, will have no effect on order processing performance, provided it can be completed overnight.

For someone in the process of selecting a departmental system, among the many issues that must be resolved are application development time, end-user support requirements, system expandability, security, fault tolerance and cost.

The appropriateness of a particular architecture is key. Building a resource utilization profile and comparing it with system architectures helps answer a crucial question: Can this system adequately support the proposed application?

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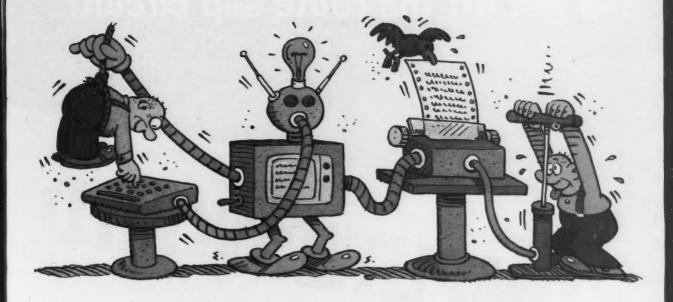
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End users reap technology's benefits

386 chips and macros are placing added capabilities and control in end users' hands

BY PATRICIA B. SEYBOLD & JUDITHS, HURWITZ

ithin the computer industry, visionary end users and data processing managers have blazed new paths, redefining the way we do business. Today these pioneering souls are discovering that the technology is available to implement ground-breaking business applications. Some of these people are availing themselves of the new breed of applications generators; others are turning to expert systems technology; still others are employing multimedia technology barely out of the research and development labs.

heavily invested in computer technology. Most systems whether mainframe, mini or PC have been utilized to help the user make better informed and faster business decisions. Minicomputers traditionally have been used to create complex data base applications as well as provide a vehicle for integrated office system software

PCs gained popularity by pro-viding spreadsheets, small data bases and word processing programs. More recently, the two technologies have begun to merge, making PCs work as terminals on the mainframe and minicomputers. PCs are increasingly being linked into local-area networks

The landscape continues to shift. As microcomputer chips

Seybold is president and chief executive officer of The Office Computing Group, Inc., a Boston, Mass.-based publishing and consulting firm.

Hurwitz is news editor and consul tant with The Office Computing Group such as the Intel Corp. 80386 debut, the power of these systems increases and prices fall. This increasing power has

Not all the tools that make ap-

broadened the expectations of what is possible in the end-user environment.

are many existing programs that are both powerful and easy to use, such as the macro, a tool commonly used by programmers that has made its way into the spreadsheet world. For example, Excel by Microsoft Corp. allows users to create macros by storing keystrokes and translating them into a mac-

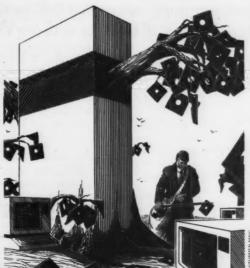
plications easier for the end-user

to access are futuristic. There

ro language. Users can then edit the macro providing they are proficient in programming in the nacro language commands The potential for extending the power of the macro is vast and the next step likely will be the development of cross-appli-

cation macros in which a macro could span a series of applications.

For example, in the Lotus Development Corp. 1-2-3 environment, software houses can use Lotus's 1-2-3 Tool Kit to allow users to create macros spanning a variety of applications by accessing the spreadsheet's user



TECHNOLOGY WATCH

A user might track accounts receivables from a customer data base. In this case, the user would be able to search a data base, place the results directly into a spreadsheet to track past receivables and then generate a word processed letter to delinquent accounts.

While this concept is new in the DP world, it has been a standard function of word processing glossaries. Vendors can learn a lot from the way programming techniques are used within word processing. For many years, clerical personnel have been generating complex custom applications using Wang Laboratories, Inc.'s glossary language — proof positive that users can do their own programming if the appropriate tools are available.

Windowing environments such as Microsoft's Windows and IBM's Operating System/2 could become the foundation for interapplication macros. These multiwindowing user interfaces are expected to evolve to include their own macro programming languages, allowing users to set up their own programs to move among applications and to trigger processes within other programs.

Application interface upswing

In the absence of these macros, a small industry has been spawned to build interfaces between applications. For example, Softbridge Microsystems Corp. in Cambridge, Mass., ties applications together using a sophisticated set of tools that are

integrated into MS-DOS. The product, Unity, consists of a developer's workstation called Context that includes a PC with a data base management system (DBMS) and a high-level programming language. Context sits between MS-DOS and the applications. The programmer or sophisticated end user utilizes these tools to tie together specific applications such as 1-2-3 and Ashton-Tate Dbase II and Multimate into a custom-tailored business application.

In addition, the tools allow programmers to write user interface screens with pop-up windows, data entry forms and reports. Unity also includes a fourth-generation language. Unity is a powerful tool; however, the cost of the development

system and the accompanying consulting services is significant because it is the first generation of such tools. In the future, this type of tool will be available in the form of user-programmable macros.

Another solution providing development tools to end users is application generators. While the technology for application generators is not new, the tools increasing power and ease of use are. The real state-of-the-art development is in PC-based applications. In fact, the best software is being developed for PCs because the PC, by its very nature, is interactive and graphics oriented. One such PC application is Dataease, developed by Trumbell, Conn.-based Dataease International, Inc. (formerly Software Solutions, Inc.), While Dataease is not a product that end users could use easily from start to finish, end users could prototype their applications and pass them on to a data base programmer to complete the application.

The data base design product automatically generates its own documentation. As the program is created, it generates its own comments and audit trail. The developer creates user documentation by filling in menus and forms. This automatically generates the Help screens and drafts the end-user documentation.

Wang Laboratories' Professional Application Creation Environment (PACE) is another example of the current breed of applications generators. Although Wang has not yet migrated PACE to the PC, PACE on the Wang VS represents the type of tool an end user can utilize to develop reports, construct queries against multiple related data bases and design simple applications.

Flexibility for eager end users

More elaborate applications design may require a programmer's experience and intervention. This breed of applications generator must be flexible enough for a visionary business manager who wants to devote the time and energy to prototype an application. As the tools become more sophisticated, this same user may be able to create polished applications.

Naturally, not all business professionals want to roll up their sleeves at the computer. These end users should be able to describe their needs to an analyst who will use the new application development tools. Because these tools allow for faster prototyping, even when the end user works with an analyst, the process is much more interactive.

The most important characteristic of this generation of programming tools is their flexibility in accommodating change.

For example, if users access a state-ofthe-art DBMS on a personal computer or minicomputer, they should be able to add fields, change lengths of fields and move elements around in the data base without having to recompile or rewrite the application.

These new application generators also will automatically document, compile and optimize code for a particular system with audit trails built in. Prototyping will be an integral part of the design. Many of these data base tools will be constructed so that a user can begin with a single PC application and migrate it to a larger platform or to a multiuser PC system.

The latest generation of query languages allows users to join queries across data bases whether they exist on mainframes, minicomputers or PCs. An example is Hewlett-Packard Co.'s Information

"This company's MIS Director bought several systems...multiple vendor deal...a few years ago. All over-the-hill now. But now of course, management's screaming for operations help. His PC users are banging on the table for more power. He's mad at his vendors. He's even mad at me. His wife's mad because he's never home. I mean, he's getting it from all sides and the sad part is it's starting to look like it's his fault, which it isn't.



So, I went to see him. All
I wanted to recommend
is that he put in a Wang
VS to tie his systems
together. Don't trash his
old systems. Make his PC
users happy...get them
into the swing of things.
Get management off
his neck...give them the

systems they want...keep his meat and potatoes applications that he's spent

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TECHNOLOGY WATCH

Access query facility. From a PC, the user can build a table that joins elements re-trieved from a PC data base, such as Dbase II, HP's Image 3000 data bases and even from Cullinet Software, Inc.'s IDMS on the mainframe. In the future, HP's Allbase Unix data base will also be accessible through Information Access

Another Unix DBMS query facility. Multiplex from Cupertino, Calif.-based Network Innovations Corp., allows PC users to query a variety of Unix data bases through a Lotus-like user interface, creating relational tables at the PC and then porting the information into PC data ases and spreadsheets.

Vendors are beginning to realize that it isn't enough to deal only with data, numbers and text. End users react to the world in a visual format and most of the data they deal with on a day-to-day basis is graphical. Therefore, data bases that allow images to be stored along with text are emerging.

Optical disk storage Companies such as Menlo Park, Calif.based Informix Software, Inc., San Jose, Calif.-based Plexus Computers, Inc. and Lowell, Mass.-based Wang have begun to use optical disks to store visual information. Microcomputer chips from General Electric Co. and RCA Corp. promise to power display systems that support multimedia optical disks and compact disk/ read-only memory (CD-ROM), including full-motion video.

Hypertext applications allow users to fully exploit these multimedia technologies and provides a new way of presenting data. In the Hypertext environment, users can place pointers either between text files or data bases. Pointers can be made to music, images or video.

Owl International, Inc., located in Bellevue, Wash., has developed a hypertext system called Guide. Available on Apple Computer, Inc. Macintoshes and PCs, Guide has been used by Ford Motor Co. to help automotive mechanics diagnose problems on its line of Taurus cars. When a repair is needed, the engine is hooked up to the computer, which diagnoses the problem and presents a mechanic with a

page of a repair manual. If the mechanic needs more information, a touch-sensitive screen will allow him to point to a topic and the computer will display more detailed information on the screen.

One of the most important ramifications for end-user computing is in the area of artificial intelligence. How do these tools differ from traditional computing tools? Ease of use is the key - being able to put development tools in the hands of those who understand the business

Waltham, Mass.-based Artificial Intelligence Corp.'s Intellect query facility gives a glimpse into this future. Intellect allows a user to construct a query in English. If the system does not understand a particular word or concept, it will ask the user to supply another word. This process continues until the system sufficiently understands the question. But Intellect is much more than a natural language query facility; it gives the end user assistance in understanding and navigating through data hases.

One exciting business AI application is in the field of expert systems. For years, pioneering organizations have invested in expensive, esoteric systems and specialized programming talent to create pilot expert systems that encapsulate the knowledge of business professionals.

Ease of use is the key in AI being able to put development tools in the hands of those who understand the business.

Now these expert systems development tools are becoming available on PCs.

It is no longer necessary to invest in special-purpose AI workstations to create usable expert systems. Wayland, Mass.-based Programs In Motion, Inc.'s 1st Class software runs on PCs and is being used successfully by Du Pont Co. to design expert systems. MDBS, Inc., headquartered in Lafayette, Ind., offers the Guru expert systems builder, which also runs on PCs

A revolution is brewing amid the ranks of the end user. Perhaps it began when the first information center allowed professionals to create their own reports against once-sacred corporate data bases. However, despite the advances in hardware and software, end users need to gain an even greater understanding of computers to obtain truly accessible data

While tools are becoming easier to use, users must still think in an analytical fashion to use sophisticated tools

The situation is changing radically as the next generation of employees, who have worked with computers from an early age, enters the work force. These computer-literate end users will expect more individual computer access and power.

At the same time, companies will need to find ways to attract and keep competent managers and knowledgeable employees. These companies will need to provide state-of-the-art tools to attract skilled personnel. To these future corporate managers and end users, computers will simply be an extension of their ability to run their business.

The tools described in this article will be featured in Patricia Seybold's technology forum, "Tools for Visionary Business Users," in Cambridge, Mass., May 18-20.1

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Circle Reader Service Number 29

4GLs find a home

Nonprocedural languages overcome MIS disfavor through users

BY STAN KOLODZIEJ

few years ago, the future was clear for fourth-generation languages (4GLs). These tools would cut through the twisted knot that was the legacy of 20 years of unstructured Cobol programming, creating progress over programmer obsolescence.

It didn't happen. The 4GL invasion ran into a surprisingly tenacious resistance from MIS, whose dedication to Cobol was much stronger than expected.

But the idea wasn't a complete failure. Fourth-generation languages did make some inroads into



centralized data processing shops. What they didn't do, however, was set the MIS world on its programming head, something that many vendors, analysts and users originally expected would happen.

While much attention has focused on the vague threat that fifth-generation languages and machines pose for 4GLs, this is a long-range scenario. The real threat might be a processing environment that has suddenly become hostile, placing barriers against the expansion of 4GLS. And such ill will could be com-

And such ill will could be coming from MIS, which has been
busy slowing the inflow of microcomputers to corporate end users. MIS has been consolidating
power and reaching out with
mandates to bring end-user computing, purchasing and future
plans under its sanctioned, centralized guiding light. And MIS,

Kolodziej is Computerworld Focus's

in general, has never been too keen on 4GLs.

Yet the position of 4GLs might not be as awkward as it appears. For one thing, there will always be the 4GL footholds in those firms that are either progressive enough or that have the right mix of MIS personalities to permit experimentation.

A good example is Chicagobased Schwinn Bicycle Co. When Robert Walsh came on board as the firm's director of MIS in 1980, Schwinn, which was traditionally an IBM shop, began using 4GLs such as Software AG of North America, Inc.'s Adabas data base management system and Natural programming lan-

guage.
"We backed into 4GLs,"
Walsh explains. "The computer
center wasn't up to snuff, and we
were facing some critical business situations in the early
1980s." Walsh says that at the
time the MIS department needed new programs up and running

quickly, something the computer center, with its growing applications backlog and slow Cobol programming, just wasn't ready to provide.

'MIS wasn't reliable'

"Users wanted new programs, and MIS wasn't reliable," Walsh explains. "We didn't go searching specifically for 4GLs. We "I don't think fourth-generation languages will wither on the vine. But there is a real possibility they will be niche applications in the future."

STEPHEN WRIGHT

wanted something that could live with Assembler and that programmers could use to write re-

ports and generate screens faster than Cobol. The only things that could do that were 4GLs." Adabas and Natural were used to design inventory, sales and distribution applications. Now, all new programming at Schwinn is handled exclusively with 4GLs, Walsh adds.

The director of information services at a major West Coast defense contractor says he cannot remember when 4GLs, such as Cincom Systems, Inc.'s Man-

tis and On-Line Software International, Inc.'s Ramis II, were not being used in his organiza-

"We never really looked at Cobol and 4GLs as separate and mutually exclusive," he says. "We don't have any limits on 4GL use. 4GLs are simply more productive and user-friendly than Cobol and other programming languages. I can't remember when we didn't think that," the director says.

Universities, traditionally more liberal and less centralized in their data processing, are also big users and supporters of 4GLs.

"I think colleges are more willing to experiment," explains Jeanne Curtis, data base administrator at The University of Pennsylvania in Philadelphia and a user of Natural. "There's a history of independence among college campuses."

For every confirmed 4GL shop, however, there are many others that feel they either do not need 4GLs or do not want to go through the necessary disruptions of converting all or part of their programming to 4GLs.

Squeeze play

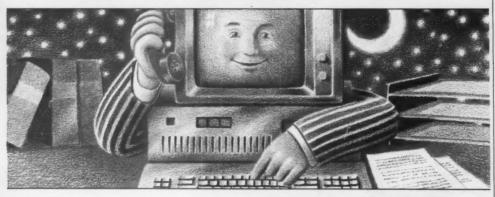
Fourth-generation languages have also been caught in an unintentional squeeze play. At the top end, MIS intransigence has thwarted most 4GL inroads. But to make matters worse, Cobol, the epitome of grey-suited programming conservatism, has been enjoying a kind of mini renaissance with the help of new American National Standards Institute upgrades, Cobol restructuring tools and Cobol generators designed to streamline and speed programming. Such thirdparty products have helped grab some press and promotional thunder from 4GLs.

"Cobol generators appeal to two types of companies," explains Stephen Wright, a Sunnyvale, Calif.-based computer consultant. "There are those companies that wish to stay with Cobol but are still anxious to use 4GLs like Adabas — but only as adjuncts to Cobol to minimize disruptions.

"The other type of company has literally hundreds of Cobol programs and doesn't want to replace them. Generators enable them to bring up new Cobol programs faster," Wright says.

There is more pressure coming at 4GLs from the microcomputer level, where micro Cobol and CICS-based programming is gaining ground with MIS as a way to accomplish some serious Cobol programming at the micro level.

"But that's not where all the pressure's going to come from at the low end," advises Ron Ross, editor of the "Data Base Newsletter" in Houston. "I've been seeing a lot of activity and enthusiasm in the [computer-aided]



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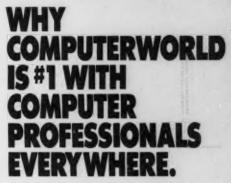
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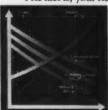
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software engineering] market lately. Though actual commercial products haven't yet appeared, there are several developers creating PC-based, graphics-oriented systems that will be capable of automatically generating Cobol code from screen graphics.

Cradle to grave

"These cradle-to-grave programming systems are already causing a stir," Ross says. "It's not unlikely that 4GLs could be bypassed as unnecessary in a few years."

Ross adds that 4GLs might soon become victims of what he sees as the continual shortening of the periods that software tools are useful in the marketplace.

"It's hard to believe that after only 10 years, 4GLs might already be on the road to obsolescence," Ross says.

"I don't think 4GLs will wither on the vine," Wright says.
"There will always be room for

"At a point, userfriendly can become its own law of diminishing returns."

FRANK SWEE

4GLs. But there is a real possibility they will be niche applications in the future. The broad support might not be there," he says.

Many 4GL vendors, however, are hoping that forecast is not true. Broad support will be there, they predict, in corporate departments, those same departments that are coming more and more under MIS's sway.

How would 4GLs gain widespread support from MIS in departmental computing? It might help to look at some history first.

Historical perspective

Fourth-generation languages initially came into being in the mid-70s when end users became tired of software development backlogs within MIS and turned to service bureaus and timesharing services to help them produce quick software pack ages. Wilton, Conn.-based D&B Computer Services, Inc.'s Nomad and Ramis, which Wright classifies as the first two 4GLs, at first were only available on a time-sharing basis. Since timesharing users were generally unsophisticated users, 4GL vendors had to create "good, user-friendly interfaces," Wright Wright explains

Fourth-generation languages and 4GL tools became so successful that they were spun off by the time-sharing firms as separate products that were purchased by progressive managers in various departments with or without the blessing and help of MIS.

This period was marked by two major developments. Distributed processing — the concept of dispersing terminals and, later, micros, to the corporate masses and departments — was in. This was also the beginning of the big data center application backlogs that gained trade press and industry attention.

In' this atmosphere, 4GLs

were suddenly promoted by vendors as serious tools for MIS software development. And that is the point at which most 4GLs reached their waterloos. Though 4GLs did manage to convert a few flagship DP shops and several smaller DP shops, most MIS managers simply found 4GLs too limited and resource devouring to handle heavy-duty application

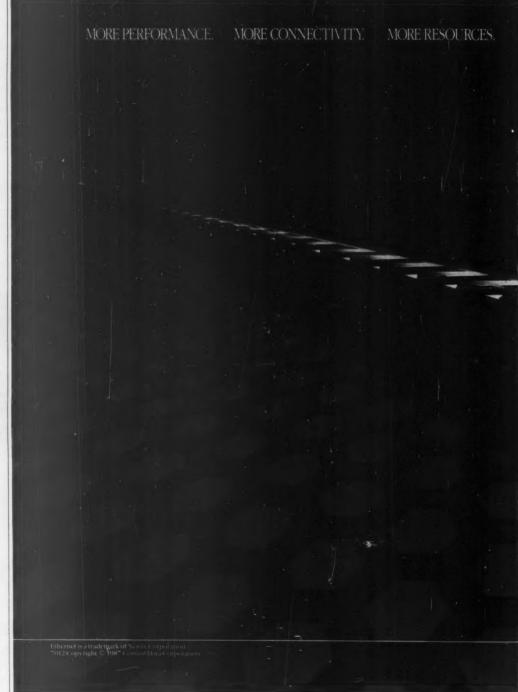
development, a stigma that

"You have to remember that although DP is generally a reactionary group, some of their suspicions about 4GLs are well founded," claims Frank Sweet, a computer analyst based in Jacksonville, Fla., who deals extensively with 4GLs.

Fourth-generation languages

rebounded from central MIS shops only to find that many end users' attitudes toward 4GLs in distributed processing installations were changing. Vendors had either oversold the simplicity of 4GLs or overestimated the enthusiasm and sophistication of end users to handle their own programming.

"At a point, user-friendly can



become its own law of diminishing returns," Sweet explains. "Sometimes I think the easier programs and programming become, the more resistance on the part of users. Most users I've come across would rather be led step-by-step through a program.

"There's a point reached at which the software and machine do so much for you that it opens up a whole area of freedom that users don't want to handle. I don't know how far 4GLs can go in the way of simplicity without actually alienating more users."

In fact, it can be argued that serious end-user programming with 4GLs is still a myth. Even at 4GL installations at which end users reportedly are handling their own extensive program-

ming, more often than not they are mainly generating minor lists and reports using built-in 4GL utilities. In all fairness, however, these 4GL end users are still producing more than end users in typical Cobol shops.

A bad taste for 4GLs

Rightly or wrongly, distributed computing had became synony-

mous with what was perceived to be the almost anarchic dispersal of PCs within corporations. When MIS reaction set in, the concept of distributed computing went out, leaving a bad taste for 4GLs in many MIS shops.

The demand from end users for quick, efficient applications, however, did not abate. If anything, it has grown.

Though often tightly controlled by MIS, many corporate departments are now developing some degree of processing autonomy because of the necessity of MIS to concentrate on large-scale applications development and maintenance.

In these cases, 4GLs are again being looked at by MIS as important tools to design and get end-user applications up and running quickly. In effect, many 4GLs are being used to relieve MIS of user pressure and criticism.

GTE's Communications Systems Division in Needham Heights, Mass., for example, has struck a balance between its predominant Cobol, CICS DP center applications and the more department-specific applications being produced by MIS using Ramis II and Applied Data Research, Inc.'s Ideal.

Not that such 4GL applications are small. "Our materials

It can be argued that serious end-user programming with 4GLs continues to be a myth.

management system has 20 online, integrated data bases with the financial side written in [Ideal]," explains Doug Allen, the division's data administrator.

GTE is a study in how 4GLs can coexist with Cobol in large DP shops. "We don't like to say departments are becoming more autonomous here," Allen says. 'It's more a case of controlling the distribution of data to users. With the advent of PC data bases years ago, my job was becoming difficult. Users would download a ton of data from the mainframe to their personal computer 20Mbyte hard disks. There were too many PC data bases floating around. It was a nightmare. We would change something in the software, mainframe and it would affect all the data bases.

"Now we've pulled in the reins on individual users," he says. "We're working on a controlled, departmental approach, and 4GLs are the tools."

A plan in the works

Allen adds that his division is working on a plan called Accelerated Systems Design Methodology, which will bring more services such as personal computer modeling to departments.

Allen says that 4GLs will play a big part in future plans.

Such corporate settings seem ideal for 4GLs and 4GL-based development tools. MIS, given instructions to cut escalating development backlogs, can assign programmers, like software SWAT teams, to work closely



and develop on-going relationships with end users out in the field.

Without tying up valuable mainframe CPU cycles, 4GLs enable users and programmers to sit at terminals and PCs and take programs through design, prototyping, debugging and even through coding stages if necessary. The numerous Cobol

Whatever happens, fourth-generation languages will no doubt become more embroiled in corporate politics and maneuverings.

interfaces that are available from 4GL vendors also make sure that new programs fit with existing applications.

This type of approach has

some real benefits for both sides. End users and MIS can develop a better understanding of each other's needs. That rapport can mean the delivery of applications that are closer to the mark of what users really want. MIS can also watch, control and guide the progress of 4GLs, making sure 4GL departmental computing fits within the larger pattern and framework of corporate computing — but at a distance.

Departmental computing and 4GLs should become good allies. Departmental computing is made possible by the decreasing costs and increasing power of microcomputer-based machines such as Digital Equipment Corp.'s Microvax I and II, Intel Corp. 80386 microprocessorbased machines and even IBM's 9370. All of these machines could eventually become important platforms for 4GLs to strengthen their position in departments. In the short term, however, they could also be direct competitors.

Whatever happens, 4GLs will no doubt become more embroiled in corporate politics and maneuverings. With more programmers, systems analysts and even micro managers working out in the field with users and employing sophisticated software development tools, departments could gain more political clout by pointing out to upper level management the definite productivity gains of departmental applications development, with or without MIS's support.

"I think 4GLs are already being used in corporate politics," Sweet says. "These languages, like distributed machines, relational data bases and file servers, are being used as pawns against MIS to get more results for users. It's something users can point to and say, 'It's there if we need it."

Expert systems support

The numerous expert systems being developed in-house by large corporations also promise more support for 4GLs. Expert systems often employ 4GL-type interfaces between their software shells and users. "Expert systems are another refinement of 4GLs," explains Dan Rosenberg, a manager in the Atlanta offices of Price Waterhouse.

Though most expert systems are currently being developed on mainframes and minicomputers, Rosenberg sees them eventually becoming much simpler to produce at the departmental level.

"I think it boils down to performance," Wright says. "Right now, Cobol can handle 100% of all applications, while 4GLs can handle about 80%."

"I have a client company in Florida that is progressive, always experimenting — all they do are 4GLs," Sweet explains. "I have to hold them back. I have another client in New Jersey that I can't interest in 4GLs. They are unbelievably staid, old-fashioned. They are beyond unstructured Cobol. For 30 years, MIS people have left this company, new ones have come in, and somehow the same corporate personality still remains.

"I guess my point is that companies have personalities, too. There will always be those that ignore 4GLs. There will always be those that can't wait to get their hands on 4GLs, There's still a big market in between those extremes."



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54 FOCUS

Minis reign over PC LANs

BY REBECCA HURST

onnectivity is king in the land of departmental computing, and the minicomputer has been a faithful servant, providing users with a variety of means for sharing and integrating their electronically stored information.

But lately, regard for the mini's computing strengths have been eclipsed by the industry's fascination with a new shining white knight,

the personal computer local-area network (LAN). The PC LAN promises users a low-cost way to share information and the flexibility to choose the applications they want. It also gives users more computing power on their desks.

However, the PC LAN, a relative newcomer to the departmental scene, does not yet provide the same computing functionality as the more seasoned minicomputer. In the departmental arena, the mini often provides more sophisticated applications and tools for managing distributed functions than does the PC LAN. MIS managers must examine each technology to determine the combination of strengths and weaknesses that best solves their departmental computing needs.

PC LANs have matured to the point at which they can provide clear advantages for some users, according to Judith Hurwitz, a consultant for Patricia Seybold's Office Group in Boston. "At one time, PC LANs were limited by disk size," she says. "Now we're beginning to see larger disks, and things that could once be done only on a mini are now being handled by PC LANs." For example, Hurwitz notes, users can access a centrally located word processing application on a network server.

PCs are also providing a level of integration that matches or exceeds that of minicomputers, Hurwitz claims. Products such as Microsoft Corp. Windows and the X Windows standard allow users to integrate applications and maintain a consistent interface. "With these windowing products you can have word processing in one corner and a spreadsheet in the other," she comments.

In addition to these software features, PC

LANs offer hardware cost benefits, according to Hurwitz. For example, a LAN with 10 PCs costs less than a dedicated minicomputer, she says. Also, a mini has a set number of users that can physically attach to it. "When it's out of room, you have to upgrade to a larger system." Users are enamored of PC LAN technology because it costs less to add nodes or create a second IAN with a bridge to the first.

ond LAN with a bridge to the first.

Despite these advantages, PC LANs have several shortcomings in providing departmental computing solutions. Moreover, these weaknesses are the minicomputer's strengths, particularly in terms of software.

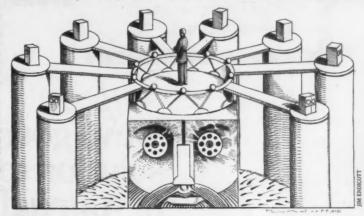
First, minicomputers have more mature multiuser applications than do PCs, according to Doug Woodward, software regional director of

advanced office systems for the Houston office of Arthur Young. "PC and PC LAN packages are just getting into that realm," he says. "Minicomputer applications are a safer bet."

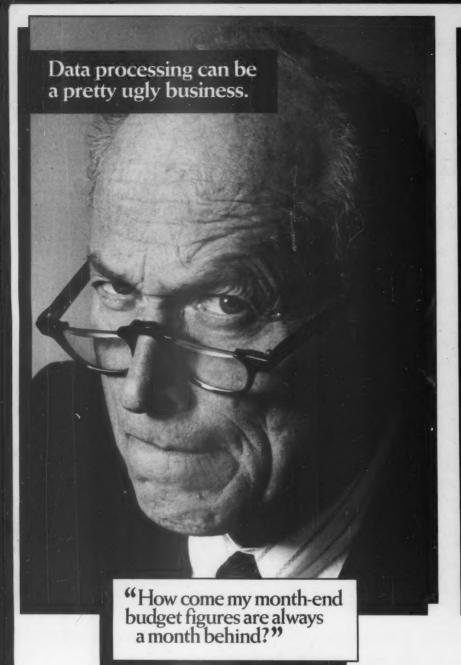
Second, minicomputers run tightly integrated software packages such as Digital Equipment Corp.'s Al-In-1 and Data General Corp.'s Comprehensive Electronic Office (CEO), Woodward says. "It's not just the features of the applications but the integration of those features that counts." For example, he says, a mini-based integrated office package with word processing and electronic mail often can displace a company's operational costs better than a separate word processing package coupled with an Email service such as Western Union Corp.'s Easylink.

Integrated, multiuser office applications do not exist yet for PC LANs. In addition, windowing products such as Windows are currently not designed for multiuser environments, and even when these products do exist, it will be some time before application developers introduce products based on them.

In terms of both software and management, minicomputers provide better security and maintenance tools. Minis have several levels of password protection for getting on the system and yet another level to get to an application, Hurwitz observes. PC LANs, she says, do not



Hurst is a Computerworld Focus senior writer.





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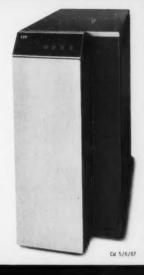
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CONNECTIVITY OPTIONS

have similarly sophisticated security procedures.

Minicomputers more effective maintenance and diagnostic tools, according to Myron Kerstetter, program director of the small computer system service at the Gartner Group, Inc., a Stamford, Conn.based research firm.

Managers need to be able to diagnose problems throughout their computing system, Kerstetter says. "The more I can find out to tell the experts, the better.

Running diagnostics on minicomputers is easier because managers need only look in one location. For PC LANs, users need diagnostics that make problems visible throughout the network, and fully mature tools that can do this are not available yet, Kerstetter explains.

Similarly, MIS managers need tools for maintaining software across the network because users may need to disperse changes to an operating system or applications, he explains. However, the tools for making networkwide changes from one site do not yet exist.

Another disadvantage of PC LANs is that they tend to be isolated from the rest of the corporate information system, according to Claire Messier, product marketing manager for DEC's All-In-1 family.

This isolation problem lies in the definition of the PC LAN itself, which is simply a group of personal computers linked together on a network to share files and peripherals. By contrast, mini vendors have introduced several communications products to bridge the gaps between the desktop, department and MIS.

Variety spices up minis

Minicomputers also provide advantages over micro-to-mainframe solutions because the variety of network communications mini vendors offer presents users with several configuration options. Also, there is a greater number of mini applications that can be easily tailored to departmental needs, Woodward notes.

micro-to-mainframe Like links and PC LANs, however, minicomputers that act as host servers to PCs have limitations in the area of integration. The most common form of communication between the PC and mini - terminal emulation - has a few problems associated with it.

For example, there is performance degradation because of the communications, says Andria Rossi, president of Marblehead, Mass,-based Rossi Consultants. More importantly, the PC loses its local processing ability when it is used for terminal emulation, Rossi notes. Also, the PC only acts as a terminal until the user creates a document.

"The minute you create a

PCs still strong in small firms

MINICOMPUTERS MAY RULE in many large companies' departments, but in small businesses, the personal computer holds

PCs have made a large impact on the way small firms operate, according to a recent survey of more than 1,000 small businesses by CAP International, Inc., a Marshfield. Mass.-based consulting firm.

These companies, which represent 51.2% of the total U.S. work force, contribute significantly to the buying trends of information processing equipment.

Among the smallest companies with five to nine employees - 48.3% use PCs, CAP reports. That percentage climbs to 54.2% for 10- to 19-person firms, 60.7% for 20- to 49-person firms and 67.8% for firms employing 50 to 99 people.

An important reason for the PC's appeal is its perceived flexibility, the survey reveals. According to the report, users are attracted by the availability of general-purpose applications such as word processing and accounting as well as more specialized software. Further, once a company buys a PC for one application, it is soon used for other applications, leading to additional PC purchases, CAP's research shows.

Not surprisingly, the research firm reports that the larger the small business, the more likely it is to purchase a personal com-

Hurst is a Computerworld Focus senior writer.

puter during the next 12 months. CAP has found that almost 25% of small businesses with 50 to 99 employees expect to purchase a personal computer in the next 12 months. "Even though the largest small businesses have minicomputers, they are also likely to have PCs," explains Raymond Boggs, director of CAP's Small Business Datatrack Ser-

Many of the small businesses that now have multiuser or minicomputer systems once only had PCs, Boggs reports. As their computing demands have grown, he explains, businesses have turned to multiuser systems to share resources, manage mail lists or drive certain applications. Today, 30% of small business users have at least one multiuser computer installed, and Boggs says he expects that number to grow.

Still, the addition of a multiuser system does not mark the retirement of the PC. "Old PCs don't die or fade away," Boggs explains, "they simply get shifted around."

Additionally, multiuser computers are not the only solution these users consider.

A small number of firms have begun installing PC local-area networks (LAN) Among respondents, 8.9% of the firms with 50 to 99 employees use PC LANs. The percentages for the other small business categories are 7.6% for the 20- to 49-employee group, 4.6% for the 10- to 19-employee group and 4.4% for the five- to nine-employ-

Hurwitz notes, and managers should give these users PCs and terminal emulation cards. Managers should also try to capitalize on their current investments in systems, Rossi comments. For example, an office with several PCs can set up a multiuser environment by installing a LAN and server. Of course, the need for specific ap-

Security consideration

runs on minis.

A final technical consideration is the degree of security required. As mentioned previously, minis provide more sophisticated security systems than PC LANs.

PCs, Rossi recommends, be-cause "these applications really

bog down a mini." Chances are

that users will use a combination

of data entry and applications,

plications may override other

system purchase considerations.

ages address vertical applica-

tions, such as accounts pavable

for shipping companies. Mini ap-

plications usually do not offer a

similar range. At the same time,

a department may require a ro-

bust financial package that only

Thousands of MS-DOS pack-

Equally important to technical issues, though, are the management issues behind choosing a departmental system. Managers should ask whether the structure of their firm is centralized or decentralized, hierarchical or horizontal.

Minis can serve centralized or hierarchical corporate cultures by providing a central base within a department and by acting as a gateway to an organization's mainframe center. Concurrently, minis can also flatten a hierarchical bureaucracy. DG's Stone advises. For example, he says, "E-mail allows users a way to get to the president that they didn't have before."

Finally, managers should consider the evolving relationship between PC LANs and minicomputers. These two current adversaries will eventually converge into a single departmental computing solution. Woodward predicts. PCs will become full members of a network that unites them with minicomputers, DEC's Messier concurs.

In planning then, managers should attempt to maintain an open architecture that will afford them the flexibility for future changes. "Whatever system you buy, make sure that the vendor supports industry standards," Stone advises. These standards can be de facto ones, such as IBM's System Network Architecture, or committee stan-dards, such as the International Standards Organization's Open Systems Interconnect model.

Either way, Stone says, managers who seriously commit to open systems standards will guarantee their future in a multivendor, departmental comput-

document," she says, "the file is on the PC, and it has to be moved to a special section on the minicomputer's disk. It's a two- or three-step process." In addition, there is generally no method for moving seamlessly between local applications and software on the mini, Rossi says.

However, the degree of difficulty in using a PC and minicomputer varies with the application. Minicomputer vendors have begun introducing Microsoft MS-DOS-based versions of their office applications, and data base management system vendors provide similar PC versions. These products give the user a consistent interface and better integration of files at the file system level, according to Rossi.

The integration between third-party MS-DOS applications and minicomputer software is weaker than PC versions of mini applications. "The major problem with PC-to-mini integration is handling two different operating systems and two different environments." savs Christopher Stone, manager of office systems for Westboro, Mass.-based DG. "Moving back and forth between them is very apparent.

In response, vendors have begun developing products that allow PC applications to utilize the mini, but these products are still in their infancy. For example, DEC provides services for MS-DOS that, conceptually, provide vehicle permitting IBM PC-DOS and Microsoft MS-Net to use the capabilities of the DEC VAX processor. Kerstetter says

One problem is that MS-DOS's method of storing files on disk is different from that of mini operating systems, notes Joseph Fiorentino, department manager of product planning and management of VS systems at Wang Laboratories, Inc.

Bidirectional translator

The solution is a bidirectional translator between the formats for the mini and the PC. Ideally. this would allow users to access information without knowing where it resides. Wang and DG both report that they offer a subset of these capabilities in their product lines today. However, it will probably be two years before extensive integration is available, Woodward predicts.

The obvious conclusion is that no one system provides the perfect departmental solution. The addendum is that some of today's solutions are better suited for certain users than others. Managers can determine what type of system best meets their needs by asking several technical and management questions.

From a technical standpoint, managers should first look at the types of processes on the system and the users running them, analyst Rossi says.

If there are only a small number of PC users who simply want to share files, a PC LAN is generally more cost-effective, Rossi advises. Managers who want a distributed data base and E-mail

need the power and communica-

tions facilities of a mini, she says

If managers decide to use a minicomputer, they next have to examine the applications that users will run on it. Users who simply enter data into a data base or who are running word processing may only need a terminal, according to Hurwitz. Users who need to run spreadsheet or

graphics packages should have

Conflicts of interest

BY TOM GALVIN

fter independent computer systems and data bases have been bought and installed, MIS managers are the ones stuck with trying to merge them into an integrated network. MIS needs to be involved from the very beginning in designing and implementing systems that are functional for both MIS and individual departments. Careful operating system selection for the supermicrocomputer and desktop levels is one factor that can put MIS managers on the right track.

By selecting appropriate and compatible operating systems, MIS managers can and avoid many networking headaches. A single departmental operating system eliminates the need to support separate operating systems that may require specialized system programmers and analysts. A universal operating system benefits the MIS department as well as the individual departments by reducing development costs and creating more efficient access to corporate applications and data bases. By using a unified operating system, the need for customized applications, the development of individual data bases and restrictions for information sharing can be resolved, eliminating a major drain on both MIS's budget and resources.

A supermicro employing a standard operating system allows a department to purchase third-party software that fits individual needs rather than to rely on the MIS department for software development. Supermicro vendors are increasingly establishing joint efforts with software specialty companies to provide integrated products with full capabilities.

Although the implementation of a single operating system would help solve many problems currently facing MIS, the

choice of the operating system is complicated by the various needs of MIS and user departments within a corporate structure. Merging operating system needs for both settings poses the most difficult aspect in operating system selection.

There are several key factors that MIS must consider for the individual department operating system:

 An extensive software library is important because it offers programs that suit automation needs and avoids the time and expense of developing individually designed applications.

 Individual departments need departmental productivity tools such as report generation, electronic mail and messaging for routine office operation.

Department managers need to access corporate data applications, eliminating the need for customized or duplicate applications that exist but that users cannot access.

 The operating system's ease of use is important. Training, productivity and acceptance of a system frequently depend on the level of expertise that users think they need in order to use the system properly.

 An operating system's reliability, availability and serviceability features are important to control system maintenance costs.

 An individual department requires an operating system that provides good



MIS and user factions look for different qualities in an operating system

Galvin is a senior software engineer for Nashua, N.H.-based Datamedia Corp., a manufacturer of 32bit supermicrocomputers and desktop computing products.

SELECTION STRATEGIES

Though it is not currently a

eventually link desktops to

flexibility in hardware and

supermicros and provide

departmental operating

system, MS-DOS may

applications.

performance features as well as the ability to adapt to upgrade functions as needed. An operating system's potential use can often be as important an element as its original intent.

With the exception of the reliability, availability and serviceability features, an MIS manager's perspective when selecting an operating system often has little in common with an individual department manager's needs. MIS should keep the following considerations in mind in system selection:

• The hardware a , company uses should not necessarily be dictated by the operating system. This rule allows the MIS manager to be aggressive in purchasing the best hardware available in terms of price and performance.

· MIS departments need a standardized programming interface to provide uniformity and consistency in application programming, which will reduce the need for additional personnel training.

· Managers should consider the options available for network communications. An operating system that offers a variety of communications possibilities has benefits over a system that is limited to a single means of communication.

· An operating system that has a transparent distributed file system is an important feature for file access.

· MIS needs management and accounting tools to develop chargeback systems and to audit and monitor system use.

· Security features are necessary because of the nature of distributed systems, in which restricted access to certain areas or types of information may be de-

There are operating systems that are volving to bridge the gap between the MIS department and an individual department. Currently, the choices of operating systems are divided into two categories proprietary and nonproprietary sys-

Taking a look at the features of both these systems is important when selecting an operating system that will meet diverse needs.

Proprietary operating systems are developed by hardware manufacturers to run on a specific piece of equipment.

most cases, the operating system cannot be modified or enhanced by an applications developer. This arrangement encourages use of the equipment by a single

In contrast, nonproprietary operating systems are usually developed for their ability to run on a variety of hardware products. These operating systems aim to provide a standard environment for applications developers. They also offer the flexibility to write custom device drivers to interface with new and unique pieces of equipment.

IBM and Digital Equipment Corp. lead the market in proprietary departmental operating systems. Until recently, the System/36 has been IBM's frontline departmental processor, with more than 100,000 estimated in use. This situation may change because of IBM's new departmental arrival, the 370-compatible 9370 processor. With the introduction of

the 9370, which runs the VM/VSE operating system. IBM can now run the same operating system from the department level to its most powerful processor. The machine has mainframe capabilities that can be used at the departmental level.

Because VM is a mainframe operating system, it is more complex than a supermicro operating system. For companies with an installed base of IBM mainframes using VM, this complexity is not a problem. However, this proprietary operating system is not viable for many small users who do not have the expertise or resources to operate a system of this size.

An additional drawback to using VM is its lack of a transparent distributed file system, which makes it difficult for different departments in the same network to share files without the need for specially developed applications.

DEC's VMS operating system has been successful at the department level in part because of the firm's All-In-1 integrated office environment. This software provides office support and most of the functions needed to achieve office automation. VMS provides gateways into the IBM environment including Systems Network Architecture and LU6.2.

The DEC Vaxmate is an IBM-compatible personal computer that communicates over Ethernet and uses Microsoft Corp. MS-Net for file sharing. With VMS and the Vaxmate, DEC offers important features for an operating system that span the MIS and individual department levels, but as a proprietary system, DEC's offering is tied solely to DEC equipment.

For nonproprietary systems, the industry leaders are said to be Microsoft and AT&T. No one can argue the success that Microsoft's MS-DOS has had at the desktop level. Though it is not currently a departmental operating system, MS-DOS has the potential to evolve into an operating system that could link desktops to supermicros and provide the flexibility in hardware and applications that many companies require.

Although no such MS-DOS product has yet reached the market, when it does, it will help provide a standard programming interface at the departmental level. This capability will greatly increase the number of departmental productivity tools in much the same way that MS-DOS has provided desktop productivity tools

Unix, which is sponsored chiefly by AT&T, offers most of the features required in a departmental system. AT&T Unix System V.3 includes vital features for MIS managers, such as improvements in data integrity, systems performance. automated system administration, a dis-

tributed file system and an internal feature called Streams that facilitates the development of distributed processing applications.

These features are not the only side to Unix. At the individual department level, Unix runs numerous applications for business functions. It also excels in areas of PC and desktop integration as well as interdepartmental file sharing. Though Unix has been viewed as a difficult operating system for users, many vendors are developing user-friendly interfaces for

Many supermicro vendors are now uti-lizing an industry-standard operating system. Users can purchase equipment without having it tied to a single operating system, permitting them to employ a variety of hardware without the added expense of supporting separate operating systems. Standard operating systems usually have a pool of programmers and systems personnel to provide sophisticated development tools, reducing MIS time and costs by eliminating the need for on-

site development.
Industry-standard operating systems have advantages for hardware vendors as well. First, these systems make their equipment more desirable because it is flexible. The flexibility available with a nonproprietary operating system makes it a good choice for distributed data processing. In a typical corporate setting in which individual department managers demand easy access to information, a nonproprietary solution avoids many of the problems brought about by different hardware and the need for independent applications. Though proprietary solutions do offer the same features as nonproprietary systems, many companies already own various types of equipment that need to be included in a corporate network or have requirements that are not suited to the use of a single vendor.

Another advantage of standard operating systems is that they reduce the time and investment in software development when the next generation of hardware is introduced. Hardware vendors are now free to concentrate more on the price/ performance of their products than on the development of a unique set of software applications for their machines. Many offthe-shelf applications can run immediately and give the user a choice of applications. Vendors cannot afford to ignore the multitudes of users seeking equipment that offers choices in applications and links to other systems.

MS-DOS/Unix solution

From the MIS manager's perspective, an MS-DOS/Unix type of solution provides the environment to meet many of the challenges presented in coordinating and designing distributed data processing sys-. Efforts are under way to merge MS-DOS and Unix into a nonproprietary solution that would respond to the divergent requirements of a corporate standard operating system.

Though proprietary and nonproprietary operating systems for the most part offer the same features and capabilities, the single-vendor restriction of proprietary systems falls short of meeting the total requirements of many MIS depart-

Nonproprietary systems can offer MIS and users the advantages of flexibility and an expanding market of applications and equipment.

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TECH TALK

The work group battle

If we know anything at all about the computer industry, it is that flat growth is here to stay — at least for most segments of the market. We still have sales, but the boom times are gone.

Most of the people who are going to buy PCs, for instance, have already bought them. Some of these people will be interested in upgrading their systems, but relatively few of them will do so by purchasing an entirely new machine. It is far more likely that they are in the market for an expansion board to slip into their existing system.

As for mainframes, people simply aren't buying. When IBM introduced its most powerful mainframe line, the 3090s, the reaction of the user community could be best described as underwhelming. It isn't that the 3090 is a lackluster box; the simple fact of the matter is that relatively few MIS officers need the kind of muscle the machine provides. At least, not right now.

But there is a hole between

DEC and IBM more or less define the departmental computing business.

PC and mainframe that is filled by departmental systems, computers that sit between mainframes and micros and act as

liaisons between them.

A cynic might suggest that the current hype about departmental computers has nothing to do with technological need. Instead, the cynic might suggest, computer vendors have squeezed almost every dollar they can out of the single-user and mainframe slots and so now must invent a place in which to shove unwanted and unneeded hardware.

It becomes particularly easy to take that point of view when one realizes that although "departmental computer" has been a buzzword for only a short time, machines that look a lot like departmental computers have been around for years. It takes some dedicated rationalizing to explain why the IBM 9370 or the new Digital Equip ment Corp. VAXs are departmental machines, while thousands of installed mid-range systems, including minicomputers, multiuser small business computers, IBM System/36s and the like, are not.



A VAX 8530 has four times the performance of an 8200.

However, there is evidence that these machines do indeed fill a technical need.

Between them, DEC and IBM more or less define the way the departmental computing business works. Each has recently made major announcements regarding its brand of departmental computing. Both sets of announcements have very little to do with hardware products and a great deal to do with connectivity.

First, DEC introduced three versions of its VAX on March 4—the VAX 8250, 8350 and 8530. One can argue they were not really new products but rather upgrades of three existing products: the VAX 8200, 8300 and 8500. The difference between the older machines and newer isn't even in hardware but in the processor microcode.

But why mince words? One can argue that no VAX is a really new product because it is not wholly distinct from previous machines. This is not meant as a slam against VAXs. In fact, it's a compliment. DEC realized before all others that by standardizing on a single architecture it could achieve almost unprecedented levels of connectivity.

Thus, the fact that no "new" VAX looks different from any old VAX is not such a bad thing. It means that departmental VAXs can take data from desktop VAXs to mainframe VAXs without so much as a hiccup in transmission.

The second set of announcements came from IBM. On March 23, IBM revealed that an existing product, the 9370 departmental computer, would be delivered earlier than had been originally planned. In addition, some weeks before.

Continued on page 64

PRODUCT CLOSE-UP

PS/2s enter the fray

Ending nearly a year of speculation, IBM introduced out of Rye Brook, N.Y., on April 2 four personal computers, systems and application software and a group of peripherals. The PCs will provide multitasking, improved graphics and sophisticated connectivity functions. The computers will be difficult to clone but are not — as some industry analysts had feared — completely closed to third-party hardware.

The microcomputers are the IBM Personal System/2 Models 30, 50, 60 and 80. All use 3½-in. disk drives. All are based on standard Intel Corp. micro-processors. The Model 80 is based on the Intel 80386-32-bit processor, the 50 and 60 will use the 80286, and the 30 is a 8086 system.

All models also make extensive use of proprietary very large-scale integration (VSLI)

chips. For example, each contains what effectively is an entire IBM Enhanced Graphics Adapter board reduced to a single chip. It is these custom chips that will make the systems difficult to du-

plicate. William C.
Lowe, IBM Entry
Systems Division
president, notes that
while the machines
make use of standard
Intel microprocessors, "those
Intel chips are completely surrounded by IBM custom logic."

Custom chips will make the PS/2 systems difficult to duplicate.

The Model 80 is a desk-side machine priced between \$6,995 and \$10,995. In its top-of-the-line configuration, the Model 80 runs at 20 MHz and features 2M bytes of memory with a 115M-byte disk. It will run a newly announced operating system, the IBM Operating System/2. This operating system is said to be

Continued on page 66

BLUE

All out war

Deidre Depke

rofessionals examining their choices among minicomputers these days have found themselves smack in the middle of a no-holds-barred war between IBM and Digital Equipment Corp. While it's possible for MIS buyers to reap the spoils of this battle, they must also avoid ending up as casualties of war.

Mid-range buyers have suddenly found themselves deluged with attractive discount schedules, extended warranties, ultraattentive technical support and beefed-up sales forces from both companies trying to sell systems to this \$8.8 billion market.

DEC brought about its sales changes with its popular VAX line of minicomputers. DEC's success with this product line has been almost startling: Analysts maintain that DEC's mid-range market share in the U.S. grew to 41% in 1986, from 23% in 1985.

More and more, DEC is selling to the general business market rather than to its traditional stronghold accounts in manufacturing and science.

DEC infiltration

Sales to business used to be IBM's strong point, and DEC's infiltration shows up dramatically in IBM's market share. IBM's piece of the total mid-range market reportedly has dropped from approximately 52% to about 29%.

The company pinpoints midrange sales as one of the contributing factors for its miserable 2.4% earnings growth in 1986 as well as its poor 27% earnings slide.

Continued on page 62

Blue Beat

Continued from page 61

Although mid-range buyers could emerge as the real winners in this contest between the two firms, the battle also poses danger for MIS consumers. It is becoming difficult to distinguish between vendor marketing rhetoric and the real technological advantages of the firms products. The danger here is that MIS may find itself saddled with departmental computers that were bought not for what they could do but on the basis of how effectively they were sold.

That rhetoric has really heated up during the last few months. For instance, IBM has declared 1987 "The Year of the Customer" and backed up that claim with detailed customer briefings. And DEC, which had never even advertised, has inundated the market with its "DEC has it now" slogan and its offshoots.

The most recent form of this rhetoric manifested itself in IBM's March an-nouncement of the Systems Application Architecture (SAA). SAA gives IBM a common interface over its major product - essentially allowing all software written to SAA standards to run on all IBM Personal Computers, System/36s, 38s and 370s.

SAA is an extremely important indica tion of IBM's strategic direction tially because it clearly identifies which Rhetoric has really heated up. For instance, IBM has declared 1987 "The Year of the Customer," and DEC has inundated the market with its "DEC has it now" slogan.

systems IBM intends to support through the 1990s. But, it will be at least two to three years before any applications emerge that can take advantage of SAA.

Because many users looking for connectivity between their systems really cannot wait that long, SAA's most immediate advantage is as a tool for IBM to use in its sales pitch against DEC. (Granted, this is not much of a sales pitch because it would have to go something like: "Digital may have it now, but we'll have it in two to three years.")

The challenge for a customer now is to dig through the advertising slogans, product discounts, statements of direction and fawning sales representatives to answer one question, Which system really meets my needs? The alternatives for large organizations basically narrow down to two choices: DEC's VAX line or IBM's muchballyhooed 9370 line of mid-range machines. But both product lines require some gambles.

Early users of the 9370 report that the machine is not easy to use. Nor has the company been able to produce much software that will run on it.

Nevertheless, IBM maintains that it has "tens of thousands" of orders for the product. (An interesting side note some IBM watchers maintain that those orders are from companies that may or may not take delivery, which makes that number misleading. And the apparent interest in the machine will not hurt DEC as much as it will hurt IBM if those orders cannibalize what would have been orders for other IBM systems, especially the System/36 or 38 machines.)

IBM is doing its best to make sure that those orders turn into sales moved up the delivery dates on some models of the 9370 line by two months to July. Originally, the product, which was announced in October, was due to be delivered by the end of the third quarter.

On the other hand, DEC's VAX line has some conspicuous gaps — some cus-tomers complain that the firm needs a high-end product with more power. And DEC has had some problems giving customers adequate levels of support.

A realistic assessment of each firm's product line is essential in light of the temporary nature of most support promises. Remember that on-site technicians and other support extras are among the first cuts a vendor will make when times get really lean or when competition becomes less intense.

Determining which system is best means ignoring marketing rhetoric and staying out of the way of IBM's and DEC's volleys at each other

Depke is editor of "IBM Watch," a biweekly newsletter to be published in June by IDG Communications, Inc

If you're looking to either expand your marketshare or make initial

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To enhance product coverage for our readers, Computerworld Focus is in-stituting a new column in its product section. The column will consist of product- and service-related questions that you, our readers, would like us to ask a particular vendor.

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Call us, toll free, at 1-800-343-6474. Or, forward your inquiries to Lory Zottola, Managing Editor, Com-puterworld Focus, 375 Cochituate Road, Box 880, Framingham, Mass. 01701-9171.

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THE INFORMATION TECHNOLOGY LEADERS



Henry F. Nanjo
Director Systems
and Data Processing
City and County of San Francisco
Age: 58
Budget: \$30 million
Cross Country Skier



As the City and County of San Francisco has discovered, there's only one sensible way to evaluate and integrate products into one cohesive

information system. And that's with a department strongly guided by an experienced, innovative information services professional like Henry Nanjo.

Henry didn't always have a multi-million dollar budget, with responsibility for the acquisition of hundreds of micros every year. In fact, when he started working with San Francisco's computers 31 years ago, Henry didn't even have a DP department. He simply worked in account-

ing with his state-of-the-art IBM 305.

Over the years, many of the applications Henry developed have helped keep San Francisco among the country's most innovative users of computer technology.

computer technology.

San Francisco made headlines recently with the first computerized fingerprint matching system. With it, prints can now be matched in less than 3 minutes—a far cry from the 4 weeks required to do the job by hand. Already, the system is credited with helping solve some 40 major unsolved crimes.

Today, Henry is in the process of evaluating both existing and potential vendors of minis and micros—and maintaining an approval list of vendors for purchases made throughout the organization. Every computer-related expenditure, whether it falls within Henry's \$30 million budget or the City and County's \$60 million budget, must bear the name of a vendor appearing on Henry's approval list.

ing on Henry's approval list.

What little spare time Henry finds, he spends with his sons camping, hiking and cross country skiing in areas like Tahoe, Yosemite Park and the Shasta Mountains.

If you'd really like to reach Henry, you'll

find him on Monday mornings with his copy of Computerworld—he's been a subscriber since the first issue. He finds Computerworld's perspective meshes closely with the way he does business, covering everything from mainframes to micros, software and state-of-the-art technologies.

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DEC renders some VAXs obsolete

Analyst: move made to spur disappointing VAX 8000 sales

Digital Equipment Corp. has unveiled three new models of its VAX 8000 series minicomput-

According to the Marlboro, Mass.-based firm, the VAX 8250, 8350 and 8530 mid-range systems feature up to a 40% increase in price/performance over the VAX 8200, 8300 and 8500 systems, which the new models are replacing. The new VAX systems incorporate DEC's VAXBI bus technology, and the company added that the machines are fully compatible with the entire DEC VAX line.

Bob Randolph, director of DEC Advisory Services at Fra-mingham, Mass.-based International Data Corp. (IDC), suggests that the VAX systems are an attempt by DEC to stimulate relatively disappointing sales in its 8000 series by prematurely obsoleting some of its 8000 series product line. IDC estimates sales for the series in 1986 amounted to 2,730 units.

The VAX 8200 and 8300 were only introduced in January 1986," Randolph says. "There certainly isn't anything overwhelming in the technology of the new systems that would warrant replacing the old systems so quickly. They are simply product

Randolph thinks DEC is using the new models to counter IBM's move of targeting its 9370 computers at departmental applications, long the bread and butter of DEC business. Randolph adds that DEC's systems offer better price/performance ratios than IBM's

"DEC also needs to have an OEM-type system at a much lower entry price and still be

compatible with the VAXBI Randolph says. "The 8250 provides a cost-effective vehicle for users to move from the DEC Microvax into the 8000 series.

"Also, the obsolescence of three machines from DEC's mainstream product line means that DEC is now producing ma-chines with 12- to 14-month product life cycles," Randolph says. "The dangers are that such a short life cycle will confuse both customers and sales force and dramatically reduce the residual value of DEC machines

The VAX 8250 is an entrylevel system priced at \$65,000. The VAX 8350 replaces the VAX 8200 and VAX 8300 sys-

tems and is priced at \$88,000. The VAX 8530 replaces the VAX 8500 and is priced at

\$291.000. — STAN KOLODZIEI Circle Reader Service Nu

Continued from page 61

the company reaffirmed its commitment to the Systems Application Architecture (SAA), a set of software interfaces that the firm says will ultimately link all its various architectures together. Presumably, that will include IBM's Personal System/2.

The combined effects of these announcements was to bring closer the day when IBM can do what DEC already can: provide universal links from the desktop to the mainframe via an intermediary machine.

Departmental machines single greatest contribution to the well-being of MIS may be their ability to allow departments to do mainframe-like applications development and processing on their own. But other multiuser machines - minis and supermicros — have offered that sort of function for years. The difference is now, for the

first time, those applications can interface with desktop systems or mainframe data bas

As the link between main-frames and the desktop, departmental systems could begin to shape the machines above and below them. The current bet is that the PS/2 will contain enough proprietary communi-cations technology to put it in what amounts to a symbiotic relationship with 370 architecture machines

In the case of DEC's mainframe-like VAXs, the 8974 and 8978, a mainframe computer was modeled on a departmental computer. The resulting connectivity was so valuable that porting over any of the smaller machine's drawbacks was a small price to pay.

The question for the future

may be how much corporate computing will be influenced by this middle tier. Perhaps eventually, everything from supercomputers to embedded systems will be shaped by departmental systems. — MICHAEL TUCKER



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mark of The Travelers Companie

Interleaf rolls out products to enhance its publishing line

Interleaf, Inc., one of the first electronic publishing companies to capture the hearts and imaginations of corporate users, has since been joined by a pack of competing suitors. Far from resting on its early reputation, however, the Cambridge, Mass.-based company plans to entice users with an array of products that enhance and extend its document processing offerings

The first of this series of products is Multi-Lingual Electronic Publishing System (MLPS), an electronic publishing system that brings Interleaf's text and graphics capabilities to European and multinational organizations.

"Interleaf realizes that many of its customers create technical publications for products that will be sold internationally," according to Peter Dyson, associate editor for the "Seybold Report on Pub-lishing Systems," headquartered in Media. Pa.

Multilingual fonts
MLPS allows users to write in multilingual fonts with all appropriate accents and special characters, explains David Boucher, Interleaf's president. Users can mark any word or block of text belonging to any of the supported languages, and the system will automatically hyphenate and verify spelling in the appropriate language for each word.

For example, Boucher says, MLPS recognizes that "awe revoire" is a failed attempt to spell the French farewell, "au

MLPS, priced at \$5,000, is an option to Interleaf's high-end Technical Publishing Software (TPS) product. Initially, MLPS will be available in French, German and English in June. Seven more languages reportedly will be available in Oc-

Interleaf also announced an enhanced release of its publishing software, TPS 4.0 that includes kerning, additional fonts, multipage tables and book masters, which globally provide indexing, pagination and cross-referencing. These features are aimed at providing higher quality text composition that will compete with offerings from such vendors as Texet Corp. and Xyvision, Inc., Dyson reports. "Clearly, Interleaf is trying to move upscale in the range of applications it can address

TPS 4.0 will be available in the fourth quarter. Interleaf has not set a price for the product yet, but the cost should not be much different than TPS 3.0's \$15,000

And that's not all. Waiting on the sidelines are low-cost software products that allow users to do some, or even all, of their work on PCs as well as mainframe versions of TPS. The PC products are in the late development stages, according to David Weinberger, Interleaf's marketing

communications manager.
The mainframe publishing application, which provides both batch and interactive processing, will go into beta test on IBM MVS- and Digital Equipment Corp. VMSbased systems this summer, he says.

Further details should be released soon, so stay tuned. - REBECCA HURST Circle Reader Service Number 102

Corrections

The Desktop Publishing special section feature comparison chart [CW Fo-cus, March 4, page 26] should have read yes for Xerox Ventura Publisher 1.0 under the category "Interactive WYSIWYG."

COMPUTERWORLD IN INC.

Reader Service Card Issue: May 6/Expires: July 15, 1987

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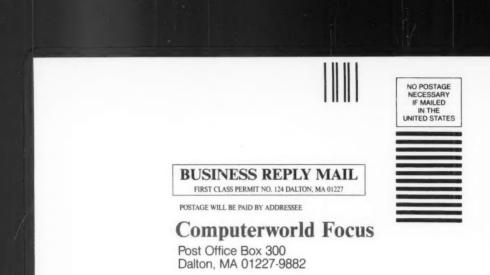
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COMPUTERWORLD

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PRODUCT CHECKLIST

General Automation, Inc. has anounced Zebra Office integrated office software.

According to the company, Zebra Office is a package running on General Automation's Zebra multiuser computers. The software includes electronic mail, personal data bases, teleconferencing functions, electronic indexing and printer sharing functions

Zebra Office is priced, depending on capacity, between \$1,400 and \$2 500

General Automation, P.O. Box 4883, 1045 S. East St., Anaheim, Calif. 92803. Circle Reader Service Number 103

Computer Associates International, Inc. has introduced CA-Programmers' Workcenter application development system.

According to Computer Associates, CA-Programmers' Workcenter is a single integrated software system that handles every phase of an application develop ment project's life cycle from conception through maintenance.

Software includes a prototyping screen generator, a report generator, file utilities, a test data generator, a CICS testing and debugging tool and a CICS Cobol application generator, Computer Associates said.

The system is priced at \$90,000 for the IBM DOS/VSE version and \$150,000 for the IBM OS/MVS version.

Computer Associates International, 711 Stewart Ave., Garden City, N.Y. 11530.

Circle Reader Service Number 104

Prime Computer, Inc. has introduced the 2755 superminicomputer.

The 32-bit 2755 system has up to 16M bytes of main memory, 64K bytes of cache memory and support for up to 128 directly connected terminals with the provision to connect up to 63 remote users through the company's Primenet network software.

The 2755 provides a maximum of 4.2G



Prime's 2755 supermini

bytes of on-line disk storage, and the company claims it executes approximately 1.6 million instructions per second. Also included is revision 20.2.1 of the Prime Primos operating system. Prime added that the 2755 is fully compatible with its existing 50 series minicomputers, and in-cabinet upgrades from the Prime 2655 systems are also available.

Prices range from \$95,050 to

Prime Computer, Prime Park, Natick,

Mass. 01760.

Circle Reader Service Number 105

VMCICS software development system has debuted from Unicorn Sys-

Unicorn Systems said its VMCICS enables Cobol and Assembler command-level CICS programs to be ported directly to an IBM VM-compatible Canaan Computer Corp. DCS departmental computer or a VM-based IBM 9370 for production.

The company added that all commandlevel CICS applications developed using Unicorn Systems' Micro CICS or IBM's CICS programming environment can run under VMCICS on the above departmental systems. According to Unicorn Sys-tems, VMCICS provides compatible IBM VSAM and DL/1 data base support.

VMCICS is available now on the Canaan system for a license fee of \$14,500. Wilshire

Unicorn Systems, 3807 Blvd., Los Angeles, Calif. 90010. Circle Reader Service Number 106

NBI, Inc. has released the 520 minicomputer

NBI said its 520 can support up to 16 users and provide up to 212M bytes of storage. The 520 handles specialized applications software such as data bases, calendaring and scheduling, legal billing, accounting and electronic publishing. The minicomputer uses a 32-bit, Motorola, Inc. 68020 processor and VMEbus.

The 520 costs \$18,900.

NBI, P.O. Box 9001, 3450 Mitchell Lane, Boulder, Colo. 80301.

Circle Reader Service Number 107

Canaan Computer Corp. has unwrapped the DCS 6000 departmental computers

The DCS 6000 family of 32-bit, multiuser IBM VM/CMS-compatible departmental computers were designed, accordto Canaan Computer, organizations committed to the IBM 370 computing environment

The entry-level DCS 6100 supports four users, has 2M bytes of main memory, 170M bytes of disk memory and a streaming tape cartridge. The 12-user DCS 6100 has 4M bytes of main memory, 310M bytes of disk memory and a 9-track 1/2-in. tape drive. The 20-user DCS 6300 has 16M bytes of main memory, 16K bytes of disk cache memory and 3.4G bytes of direct access storage. An IBMcompatible 1.6K/3.2K bit/in. magnetic tape drive is standard with the 6300.

The four-user DCS 6100 costs \$42,500; the 12-user DCS 6100 costs \$58,000; and the DCS 6300 starts at less than \$80,000.

Canaan Computer, 39 Lindeman Drive, Trumbull, Conn. 06611.

Circle Reader Service Number 108

DTSS, Inc. has introduced the Sofstore electronic software distribution system.

Sofstore is a micro/mainframe software distribution system that DTSS said delivers brand name and proprietary IBM Personal Computer software programs and updates to end users.

The system is based on a centralized structure the company calls a "store," through which authorized customers, or end users, can scan, order, download and

use personal computer applications.

Reviews and cost comparisons of available software options are created by product managers in charge of selecting and stocking programs based on corporate and end-user requirements. Using a series of screens that model individual corporate approval processes, the system allows users to download the programs of their choice to either a floppy or hard disk.

Sofstore incorporates host and PC software as well as DTSS's Datapass, a micro-to-mainframe link. The initial release runs under IBM VM/CMS, using the IBM SQL/DS data base. Sofstore is priced at \$75,000

DTSS, P.O. Box 70, Buck Road, Hanover. N.H. 03755.

Circle Reader Service Number 109

Avatar Technologies, Inc. has rolled out the Macmainframe SE communications product.

Macmainframe SE is composed of diskette software and a plug-in card that fits into an expansion port on the Apple Computer, Inc. Macintosh SE, providing IBM 3278 terminal emulation and file transfer.

According to the company, the Document File Transfer facility can produce an exact representation, or mirror image, of a Macintosh file on the host, enabling Mac users to utilize the host as a central mailbox. The applications program interface gives software developers driver-level access to Avatar's IBM 3270 terminal emulation and file transfer applications.

The product costs \$795.

Avatar Technologies, 99 South St., Hopkinton, Mass. 01748.

Circle Reader Service Number 110

Compaq Computer Corp. has unwrapped the Deskpro 286 line.



Avatar's Macmainframe SE

The 12-MHz Compaq Deskpro 286 family is based on the Intel Corp. 80286 processor. The micros offer up to 80M bytes of fixed-disk storage with the option of an internal 40M-byte fixed-disk tape backup and the ability to expand system memory up to 8.1M bytes.

The Deskpro 286 Model 1 carries 256K bytes of main memory and a 1.2Mbyte diskette drive, Compaq said. The Model 20 has 640K bytes of main memory and a 20M-byte, half-height disk drive.

Continued on page 66

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uate Road, Box 9171 n, MA 01701-9171

Checklist

Continued from page 65

The Model 40 includes 640K bytes of main memory and a 40M-byte, half-height drive.

Base price of the Compaq Deskpro 286 Model 1 is \$2,999; the Model 20 costs \$3,999; and the Model 40 costs \$4,999. Compaq Computer, 20555 FM149, Houston, Texas 77070. Circle Reader Service Number 111

Westmoreland Software International, Inc. has announced the ADD System Version 7.1.

The ADD System, designed for the IBM System/34 and 36, reportedly generates RPG-II

source code and documentation for reports, on-line inquiries, file maintenance programs, batch programs and bar graphs.

Features of Version 7.1 include a report writer language developed for nonprogrammers and three enhanced manuals.

ADD System Version 7.1 also provides the ability to preserve modification to RPG-II source code, fully access screen attributes for fields, enter compiletime arrays and copy programs from one CPU to another.

The ADD System costs \$3.850.

Westmoreland Software International, Suite 195, 853 E. Semoran Blvd., Casselberry, Fla. 32707.

Circle Reader Service Number 112

PS/2

Continued from page 61

compatible with PC-DOS but has much additional functionality.

The Model 60 is a deskside

The Model 60 is a deskside 286-based system priced between \$5,295 and \$6,295. It features 1M byte of memory expandable to 15M bytes, seven 16-bit expansion slots, one 3½-in., 1.44M-byte disk drive and either a 40M-byte or a 70M-byte hard disk drive.

The Model 50 is a desktop 286-based system priced at \$3,595. It has 1M byte of memory expandable to 7M bytes, a 20M-byte hard disk and one 3½-in. diskette. It has three 16-bit expansion slots.

The Model 30 is an 8-MHz, 8086 machine priced between \$1,695 and \$2,295. It is the machine that most resembles the first-generation PC, sporting a first-generation-style PC bus. However, the company said the machine will process information 2½ times as fast as a PC XT.

Systems software announcements included the IBM Operating System/2, developed in assocation with Microsoft Corp., and several IBM-designed enhancements of PC-DOS. The common characteristic of both operating systems is extensive connectivity under Systems Application Architecture to IBM mainframes and departmental systems such as the 9370 and the System/36 and 38.

Micro Channel bus

Particularly important for thirdparty developers, Models 50, 60 and 80 feature a new 32-bit bus structure — the Micro Channel. IBM said the Micro Channel will be superior to the existing Personal Computer bus.

IBM also announced a line of monitors and printers to go

along with the PCs.

The PS/2 models will be very difficult to clone. Reverse-engineering the machines would entail the dissection of several VLSI chips. While that is not impossible, it would require both time and money. On the other hand, the PCs are not the airtight boxes that were feared. Board makers, for instance, should have relatively little trouble shifting their products to the Micro Channel architecture. Much of the existing MS-DOS software will be able to play on the new machines as well.

The machines are, therefore, both a challenge to and an interesting comparison with Digital Equipment Corp. systems. They could end DEC's monopoly on desktop-to-mainframe connections.

But, at the same time, they are far more open than DEC's low-end VAX products, which contain no room for third-party hardware. — MICHAEL TUCKER

Circle Reader Service Number 113

ARBITER VENTS PEER-TO-PEER PRESSURE



The Micro/ Mainframe Cooperative Processing Software Solution

The pressure is mounting to integrate hundreds of increasingly more powerful PCs into existing networks. Networks with teleprocessing subsystems originally designed to support terminals.

Application backlogs have created pressure to provide advanced program communications between intelligent processors using current and next-generation languages and data bases.

There's pressure between peer groups in organizations to use their own mainframe- or PC-based tools.

And there's even pressure on companies to make strategic connectivity decisions given the myriad temporary link fixes on the market and the promises of future deliverables from a single vendor.

The answer to peer-to-peer pressure is peer-to-peer communications. The answer is Arbiter.

Arbiter is a VTAM-based, cooperative processing sub-system which was designed to integrate mainframes and microcomputers as peers. As a VTAM subsystem. Arbiter is capable of supporting hundreds of PCs simultaneously with higher data transfer rates and lower system overhead than CICSand TSO-based approaches. Fully SNA-compatible, Arbiter not only improves the performance of existing networks with LU 2 and async devices, but, by design, is compatible and performs optimally with LU 6.2.

Arbiter's advanced file transfer facilities include application program interfaces (APIs) to existing COBOL, PL/I, Pascal and Assembler applications, and a general-purpose External File Interface utility. In addition, Arbiter delivers total end-to-end communications between 4GL and data base extraction packages (e.g. SAS*) and PC tools like Lotus 1-2-3* and dBASE II* and III.*

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Arbiter's cooperative processing orchitecture: The Remote Disk Environment (RDE) provides a semiles interface to remote disks on the healt. The External File Interface (EFI) transfers data to and from files on the hoal. The Interactive Session Relay (ISR) consects or PC to conditive mainframe subsystem simultaneously Data transfers may be interactive or batch in both directions, directly or through remote disks using familiar PC DOS commands. Arbiter's dynamic management of VSAM data sets and a more efficient VTAM-based transport vehicle result in a superior implementation of the virtual disk concept

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Circle Reader Service Number 40

CALENDAR

May 10-16

Software Maintenance. Toronto, May 10-13 - Contact: Software Maintenance Association, c/o Robert Grenoble, P.O. 391432, Mountain View, Calif.

Desktop Publishing '87 Conference. San Francisco, May 11-13 — Contact: Carol Peters, Online International, Inc., 989 Avenue of the Americas, New York, N V 10018

CD-I/The Future Conference. San Francisco, May 11-13 - Contact: Carol Peters, Online International, Inc., 989 Avenue of the Americas, New York, N.Y.

Intercompany Networks: Strategy and Implementation. New York, May - Contact: William Smulsky, The Yankee Group, 200 Portland St., Boston, Mass. 02114.

May 17-23

Computer-Integrated Manufacturing. Atlanta, May 18-19 — Contact: Gartner Group, Inc., P.O. Box 10212, 72 Cummings Point Road, Stamford, Conn.

Patricia Seybold's Technology Forum. Cambridge, Mass., May 18-20 -Contact: Judith Hurwitz, The Office Computing Group, Suite 612, 148 State St., Boston, Mass. 02109.

Eighth Annual Conference on Applications of Computer-Aided Systems Engineering Tools. Ann Arbor, Mich., May 18-22 — Contact: Rebecca Size-more, Meta Systems, Ltd., Suite 200, 315 E. Eisenhower, Ann Arbor, Mich.

New Aids To Executive Decision Making. New York, May 19-20 — Contact: The Conference Board, P.O. Box 4026, Church Street Station, New York, N.Y. 10261.

May 24-30

CASE '87. Cambridge, Mass., May 27-29 — Contact: Elliot Chikofsky, Index Technology Corp., 101 Main St., Cambridge, Mass. 02142.

National Computer Graphics Association Desktop Publishing Roundtable. San Francisco, May 27 — Contact: Barbara lazzetti, NCGA, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

May 31-June 6

The Eleventh Annual Meeting of the National Focus Users Group (Fuse). Palm Desert, Calif., May 31-June 5 — Contact: Jeany Einhorn, Fuse, Inc., Suite 4302, 450 7th Ave., New York, N.Y. 10123.

Comdex/Spring '87. Atlanta, June 1-4 · Contact: Comdex/Spring '87, Registration Department, 300 First Ave., Needham, Mass. 02194.

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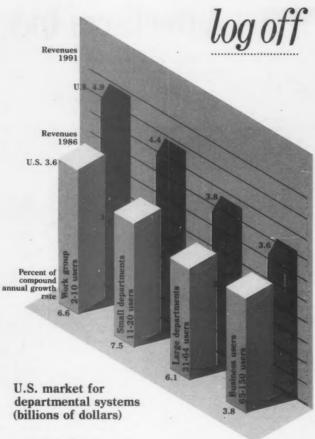
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next issue

n June, CW Focus will spotlight data security and system protection. As access to computers and data increases, the potential for security problems escalate. So, from hacker prevention to hot sites, passwords to power conditioners, CW Focus will cover the best methods to safeguard your computing resources. Security has become a corporate issue, and MIS must educate executives and users on the importance of this growing concern.

The office champion

Thomas Roberts

am often asked which technology will ultimately win in the office, the personal computer local-area network (LAN) or departmental computers. The question is misleading because it implies one technology will vanquish the other. In the war for the hearts and minds of computer users, nothing is that simple.

On average, departmental systems offer a better solution than do networked PCs for processing office applications. But LAN technology is improving steadily, and PC LAN capabilities will soon rival those of departmental systems.

From the standpoint of appli cations software, departmental computing evangelists argue that centralized processing is still the best solution for crucial business functions. Applications such as order entry, inventory tracking and accounting are multiuser in nature and require the



scrupulous maintenance of a central data base. Distributed solutions cannot support such centralized departmental needs.

To a large extent, this centralized stance is correct. The needs of even small departments are often beyond the capabilities of data bases installed on stand-alone PCs. And, while vendors of PC data bases have invested heavily in developing network versions of their software, few of these products are up to the task of supporting an office full of concurrent users.

Devotees of departmental computing also argue that a small, centralized system is easier to install, use and manage than a complex, bug-rid-den network of PCs. These advocates evoke visions of small-footprint terminals connected to a minicomputer expressly designed for use in an office environment. But this view belies that departmental systems are minicomputers at heart. Despite their shrunken size and the way they blend in with your filing cabinets, departmental computers demand the expertise of an experienced systems administrator.

Although PC LANs aren't yet any easier to use or administer than office minis, they offer significant advantages in flexibility and expandability. During the past year, PC LANs have become more reliable, and network operating systems have become more robust and rich in features. For example, Novell, Inc. now offers fault tolerance and audit trail features in its advanced Netware operating system.

But improvements in LAN technology will not diminish the importance of departmental computers. Already, as PC networks grow in size, office minis are being asked to perform double duty as LAN servers. Departmental system vendors also offer methods for connecting PCs directly into the processing architecture of their systems.

In light of these parallel developments, it is more than likely that PC LANs and departmental systems will, in time, act more as complements to one another than as archrivals.

Roberts is manager of personal computer research at International Data Corp., a Framingham, Mass.-based industry research firm.

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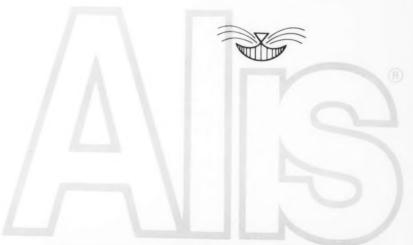
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